



SEQ ID NO: 35

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ACCAAACAAG AGAAGAGACT TGCTTGGGAA TATTAAT TCA AATAAAAAATT AACTTAGGAT 60
TAAAGAACTT TACCGAAAGG TAAGGGGAAA GAAATCC TAA GACTGTAATC ATGTTGAGTC 120
TATTGCACAC ATTCAGTGCG CGTAGGCAGG AGAACATAAC GAAATCAGCT GGTGGGGCTG 180
TTATTCCCGG GCAAAAAAAC ACTGTGTCTA TATTGCTCT TGGACCATCA ATAACAGATG 240
ACAATGATAA AATGACATTG GCTCTTCTCT TTTTGCTCA TTCTTTAGAC AATGAAAAGC 300
AGCATGCGCA AAGAGCTGGA TTTTGTAGTT CTCTGTTATC AATGGCTTAT GCCAACCCAG 360
AATTATATTT AACATCAAA TGGTAGTAATG CAGATGT TAA ATATGTTATC TACATGATAG 420
AGAAAGACCC AGGAAGACAG AAATATGGTG GGT TTGTCGT CAAGACTAGA GAGATGGTTT 480
ATGAAAAGAC AACTGATTGG ATGTTTCGGGA GTGATCT TGA GTATGATCAA GACAAATATGT 540
TGCAAAATGG TAGAAGCACT TCTACAATCG AGGATCT TGT TCATACTTTT GGATA TCCAT 600
CGTGTCTTGG AGCCCTTATA ATCCAAGTTT GGATAATACT TGTTAAGGCT ATAACCAGTA 660
TATCAGGATT GAGGAAAGGA TTCTTTACTC GGT TAGAAGC ATTTGACAA GATGGAACAG 720
TTAAATCCAG TCTAGTGTTG AGCGGTGATG CAGTAGAACA AATTGGATCA ATTATGAGGT 780
CCCAACAGAG CTTGGTAACA CTCATGGTTG AAACACT GAT AACAAATGAAC ACAGGCAGGA 840
ATGATCTGAC AACAAATAGAA AAGAATATAC AGATTGTAGG AAACATACATC AGAGATGCAG 900
GTCTTGCTTC ATTTTCAAC ACAATCAGAT ATGGCAT TGA GACTAGAATG GCAGCTCTAA 960
CTCTGTCTAC CCTTAGACCG GATATCAACA GACTCAAGGC ACTGATCGAG TTATA TCTAT 1020
CAAAGGGGCC ACGTGCTCCT TTTATATGCA TTTTGAGAGA TCCCGTGCAT GGTGAGTTT 1080
CACCAGGCAA CTATCCTGCC CTCTGGAGTT ATGCGATGGG TGTAGCAGTT GTACAAAACA 1140
AGGCCATGCA ACAGTATGTA ACAGGAAGGT CTTATCTGGA TATTGAAATG TTCCAACCTG 1200
GTCAAGCAGT GGCACGTGAT GCCGAGTCGC AGATGAGTTC AATATTAGAG GATGAACTGG 1260
GGGTACACACA AGAAGCCAAG CAAAGCTTGA AGAAACACAT GAAGAACATC AGCAGTTCAG 1320
ATACAACCTT TCATAAGCCT ACAGGGGGAT CAGCCATAGA AATGGCGATA GATGAAGAAG 1380
CAGGGCAGCC TGAATCCAGA GGAGATCAGG ATCAAGGAGA TGAGCCTCGG TCATCCATAG 1440
TTCCTTATGC ATGGGCAGAC GAAACCGGGA ATGACAA TCA AACTGAATCA ACTACAGAAA 1500
TTGACAGCAT CAAAAC TGAA CAAAGAAACA TCAGAGACAG GCTGAACAAA AGACTCAACG 1560
AGAAAAGGAA ACAGAGTGAC CCGAGATCAA CTGACATCAC AAACAACACA AATCAAACCTG 1620
AAATAGATGA TTTGTTTCACT GCATTCGGAA GCAACTAGTC ACAAAGAGAT GACCACTATC 1680
ACCAGCAACA AGTAAGAAAA ACTTAGGATT AATGGAAATT ATCCAATCCA GAGACGGAAG 1740
GACAAATCCA GAATCCAACC ACAACTCAAT CAACCAAGA TTCATGGAAG ACAATGTTCA 1800
AAACAATCAA ATCATGGATT CTTGGGAAGA GGGATCAGGA GATAAATCAT CTGACATCTC 1860
ATCGGCCCTC GACATCATTG AATTCATACT CAGCACC GAC TCCCAAGAAA ACACGGCAGA 1920
CAGCAATGAA ATCAACACAG GAACCACAAG ACTTAGCACG ACAATCTACC AACCTGAATC 1980
CAAAACAACA GAAACAAGCA AGGAAAATAG TGGACCA GCT AACAAAAATC GACAGTTTGG 2040
GGCATCACAC GAACGTGCCA CAGAGACAAA AGATAGAAAT GTTAATCAGG AGACTGTACA 2100
GGGAGGATAT AGGAGAGGAA GCAGCCCAGA TAGTAGAACT GAGACTATGG TCACTCGAAG 2160
AATCTCCAGA AGCAGCCCAG ATCCTAACAA TGGAAACC CAA ATCCAGGAAG ATATTGATTA 2220
CAATGAAGTT GGAGAGATGG ATAAGGACTC TACTAAGAGG GAAATGCGAC AATTTAAAGA 2280
TGTTCCAGTC AAGGTATCAG GAAGTGATGC CATTCTCCA ACAAACAAG ATGGAGACGG 2340
TGATGATGGA 2350
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FIGURE 1A



## SEQ ID NO: 35

AGAGGCCTGG AATCTATCAG TACATTTGAT TCAGGATATA CCAGTATAGT GACTGCCGCA 2410  
ACACTAGATG ACGAAGAAGA ACTCCTTATG AAGAACAACA GGCCAAGAAA GTATCAATCA 2470  
ACACCCCGAGA ACAGTGACAA GGGGAATTAA AAAGGGGTTG GAAGGCCAAA AGACACAGAC 2530  
AAACAATCAT CAATATTGGA CTACGAACTC AACTTCAAAG GATCGAAGAA GAGCCAGAAA 2590  
ATCCTCAAAG CCAGCACGAA TACAGGAGAA CCAACAA GAC CACAGAATGG ATCCCAGGGG 2650  
AAGAGAATCA CATCCTGGAA CATCCTCAAC AGCGAGAGCG GCAATCGAAC AGAATCAACA 2710  
AACCAAACCC ATCAGACATC AACCTCGGGA CAGAACCACA CAATGGGACC AAGCAGAACA 2770  
ACCTCCGAAC CAAGGATCAA GACACAAAAG ACGGATGGAA AGGAAAGAGA GGACACAGAA 2830  
GAGAGCACTC GATTTACAGA AAGGGCGATT ACATTAT TAC AGAATCTTGG TGTAATCCAA 2890  
TCTGCAGCAA AATTAGACCT ATACCAAGAC AAGAGAGTTG TGTGTGTGGC GAATGTCCTA 2950  
AACAATGCAG ATACTGCATC AAAGATAGAC TTCCTAGCAG GTTTGATGAT AGGAGTGTCA 3010  
ATGGATCATG ATACCAAAT T AAATCAGATT CAGAACGAGA TATTAAGTTT GAAAACTGAT 3070  
CTTAAAAAGA TGGATGAATC ACATAGAAGA CTAATTGAGA ATCAAAAAGA ACAAT TATCA 3130  
CTGATCACAT CATTAACTCTC AAATCTTAA ATTATGACAG AGAGAGGAGG GAAGAAGGAC 3190  
CAACCAGAAC CTAGCGGGAG GACATCCATG ATCAAGACAA AAGCAAAGA AGAGAAAATA 3250  
AAGAAAGTCA GGTGTGACCC TCTTATGGAA ACACAGG GCA TCGAGAAAAA CATCCCTGAC 3310  
CTCTATAGAT CAATAGAGAA AACACCAGAA AACGCACAC AGATCAAATC AGAAA TAAAC 3370  
AGATTGAATG ATGAATCCAA TGCCACTAGA TTAGTACCTA GAAGAATAAG CAGTACAATG 3430  
AGATCATTAA TAATAATCAT TAACAACAGC AATTTATCAT CAAAAGCAAA GCAATCATAC 3490  
ATCAACGAAC TCAAGCTCTG CAAGAGTGAC GAGGAAGTGT CTGAGTTGAT GGACATGTTT 3550  
AATGAGGATG TCAGCTCCCA GTAAACCGCC AACCAAGGGT CAACACCAAG AAAACAATA 3610  
GCACAAAACA GCCAATCAGA GACCACCCCA ATACACCAAA CCAATCAACA CATAACAAAG 3670  
ATCTCCAGAT CATAGATGAT TAAGAAAAAC TTAGGATGAA AGGACTAATC AATCCTCCGA 3730  
AACAATGAGC ATCACCACCT CCACAATCTA CACATTCCTA GAATCCTCTT TCTCCGAGAA 3790  
TGGCAACATA GAGCCGTTAC CACTCAAGGT CAATGAA CAG AGAAAGGCCA TACCTCATAT 3850  
TAGGGTTGTC AAGATAGGAG ATCCGCCCAA ACATGGA TCC AGATATCTGG ATGTC TTTTT 3910  
ACTGGGCTTC TTTGAGATGG AAAGGTCAA AGACAGGTAT GGGAGCATAA GTGATCTAGA 3970  
TGATGATCCA AGTTACAAGG TTTGTGGCTC TGGATCA TTG CCACTTGGGT TGGCTAGATA 4030  
CACCGGAAAT GATCAGGAAC TCCTACAGGC TGCAACCAAG CTCGATATAG AAGTAAG AAG 4090  
AACTGTAAAG GCTACGGAGA TGATAGTTTA CACTGTACA AACATCAAAC CTGAACTATA 4150  
TCCATGGTCC AGTAGATTAA GAAAAGGGAT GTTATTT GAC GCTAATAAGG TTGCACTTGC 4210  
TCCTCAATGT CTTCCACTAG ATAGAGGGAT AAAATTCAGG GTGATATTG TGAAC TGCAC 4270  
AGCAATTGGA TCAATAACTC TATTCAAAT CCCTAAGTCC ATGGCATTGT TATCA TTGCC 4330  
TAATACAATA TCAATAAATC TACAAGTACA TATCAAAACA GGAGTTCAGA CAGAT TCCAA 4390  
AGGAGTAGTT CAGATTCTAG ATGAAAAAGG TGAAAAA TCA CTAAATTTCA TGGTT CATCT 4450  
CGGGTTGATC AAAAGGAAGA TGGGCAGAA GTACTCAGTT GAATATTGTA AGCAGAAGAT 4510  
CGAGAAGATG AGATTATTAT TCTCATTGGG ATTAGTTGGA GGGATCAGCT TCCACGTCAA 4570  
CGCAACTGGC TCTATATCAA AGACATTAGC AAGTCAATTA GCATTCAAAA GAGAAATCTG 4630  
CTATCCCCTA ATGGATCTGA ATCCACACTT AAATTCAGTT ATATGGGCAT CATCAGTTGA 4690  
AATTACAAGG 4700

FIGURE 1B



SEQ ID NO: 35

GTAGATGCAG TTCTCCAGCC TTCATTACCT GCGGAAT TCA GATACTACCC AAACATCATA 4760  
GCAAAAGGGG TCGGGAAAAAT CAGACAGTAA AATCAACAAC CCTGATATCC AACAT TGCAA 4820  
ATCAGGCTAC CCACAGGAGA AAAATCAAAA ACTTAGGATC AAAGGGATCA CCACGAACCC 4880  
CGGAAAACAG CCAAACAAAC CAACACACAA ATCACAGACA AAAAGGAGAA GGC ACTGCAA 4940  
AGACCGAGAA AAAACAGAAC GCACACAACC AAGCAGAGAA AAGCCAAAGC CCGCCATTCA 5000  
CAAACACACC AACAACTCCTG CAAACAAGCA CCAAACAGA GGTCAAAGA CAAAGAGCAC 5060  
CAGATATGAC CATCACAACC ACAATCATAG CCATATTACT AATACCCCCA TCATT TTGTC 5120  
AAATAGACAT AACAAAACCTG CAACGTGTAG GTGTGTTAGT CAACAATCCT AAAGGCATGA 5180  
AGATTTTACA AAATTTGAA ACGAGATACC TGATATT AAG TTTGATACCC AAAATAGAGA 5240  
ATTCACTC ATGTGGGGAT CAACAGATAA ACCAATA CAA GAAGTTATTG GATAGATTGA 5300  
TAATTCCTCT ATATGATGGA TTAATAATTAC AAAAAGATGT AATAGTAGTA AGTCATGAAA 5360  
CCCACAACAA TACTAATCTT AGGACAAAAC GATTCTT TGG AGAGATAATT GGGACAATTG 5420  
CGATAGGGAT AGCCACTTCA GCACAAATCA CCGCAGCAGT CGCTCTTGTC GAAGC TAAAC 5480  
AGGCAAAGTC AGACATAGAA AAACCTCAAAG AGGCTAT AAG AGACACAAAC AAGGCAGTAC 5540  
AATCGATTCA AAGTTCTGTA GGTAACCTAA TTGTTGCAGT TAAATCAGT T CAAGACTATG 5600  
TCAACAATGA AATTATACCT TCAATCACAA GATTAGGCTG TGAAGCAGCA GGGTTACAAT 5660  
TGGGAATTGC ATTGACACAA CATTACTCAG AATTAACAAA TATATTTGGT GATAA TATAG 5720  
GAACACTGAA AGAAAAGGG ATAAAATTAC AAGGGATAGC ATCATTATAT CACACAAACA 5780  
TAACGGAAAT ATTTACTACT TCAACAGTTG ACCAATA TGA TATTTATGAC CTATTATTCA 5840  
CTGAGTCAAT CAAGATGAGA GTGATAGATG TTGATTGAG TGATTACTCA ATTACTCTTC 5900  
AAGTTAGACT TCCTTTATTA ACTAACTAT CAAATACTCA AATTTATAAA GTAGATTCTA 5960  
TATCATACAA CATCCAGGGC AAAGAGTGGT ATATTCCTCT TCCCAATCAC ATCATGACAA 6020  
AAGGGGCTTT TCTAGGTGGT GCTGATATTA AAGAATGCAT AGAGGCATTC AGCAGTTATA 6080  
TATGTCCTTC TGATCCAGGT TACATATTAA ATCACGAGAT AGAGAATTGT TTATCAGGGA 6140  
ACATAACACA GTGTCCTAAG ACTGTTGTTA CATCAGATGT GGTACCACGA TACGCGTTTG 6200  
TGAATGGTGG ATTAATTGCA AACTGCATAA CAACTACATG TACATGCAAT GGAAT TGACA 6260  
ATAGAATTAA TCAATCACCT GATCAAGGAA TTAAGATCAT AACACATAAA GAATGCCAGG 6320  
TAATAGGTAT AAACGGAATG TTATTCAATA CTAATAGAGA AGGGACATTA GCAACTTATA 6380  
CATTTGATGA CATCATATTA AATAACTCTG TTGCACTTAA TCCAA TTGAT ATATCTATGG 6440  
AACTCAACAA GGCAAACTA GAATTAGAAG AATCGAAGGA ATGGATAAAG AAATCAAATC 6500  
AAAAGTTAGA TTCCGTTGGA AGTTGGTATC AATCTAGTGC AACCAATCACC ATAATCATAG 6560  
TGATGATAAT AATTCAGT T ATAATCAATA TAACAAT TAT TGTAGTCATA ATCAAATTC 6620  
ATAGAATTCA GGGGAAAGAT CAAAACGACA AAAACAGTGA GCCGTATATA CTGACAAATA 6680  
GACAATAAGA CTATACACGA TCAAATATAA AAAGTACAAA AAACCTTAGGA ACAAAGTTGT 6740  
TCAACACAGC AGCACCAGAT AGACCAAAAG GCAGCGCAGA GGCGACACCA AACTCAAAAA 6800  
TGGAATATTG GAAACACACA AACAGCATAA ATAAACCAA CAATGAAACC GAAACAGCCA 6860  
GAGGCAACA TAGTAGCAAG GTTACAAATA TCATAATGTA CACCTTCTGG ACAATAACAT 6920  
TAACAATATT ATCAGTCAT T TTTATAATGA TATTGACAAA CTTAATTCAA GAGAACAAATC 6980  
ATAATAAATT AATGTTGCAG GAAATAAGAA AAGAATTGCG GGCAATAGAC ACCAAGATT 7040  
AGAGGACTTC 7050

FIGURE 1C



## SEQ ID NO: 35

GGATGACATT GGAACCTCAA TACAGTCAGG AATAAATACA AGACTTCTCA CAATT CAGAG 7110  
TCATGTTCAA AACTATATCC CACTATCATT AACACAACAA ATGTCAGATC TCAGAAAATT 7170  
TATCAATGAT CTAACAAATA AAAGAGAACA TCAAGAAAGTG CCAATACAGA GAATG ACTCA 7230  
TGATAGAGGT ATAGAACCCC TAAATCCAAA CAAGTTCTGG AGGTGTACAT CTGGTAACCC 7290  
ATCTCTAACA AGTAGTCCTA AGATAAGGTT AATACCAGGA CCAGGTTTAT TAGCAACATC 7350  
TACTACAGTA AATGGCTGTA TTAGAATTCC ATCGTTAGTA ATCAATCATC TAATC TATGC 7410  
TTACACCTCT AATCTTATTA CCCAGGGCTG TCAAGATATA GGGAAATCTT ACCAAGTACT 7470  
ACAAATAGGG ATAATTACTA TAAATTCGGA CCTAGTACCT GATTTAAACC CCAGAGTCAC 7530  
ACATACATTT AATATTGATG ATAATAGAAG ATCTTGCTCT CTGGCACTAT TGAATACAGA 7590  
TGTTTATCAG TTATGCTCAA CACCAAAAGT TGATGAAAGA TCCGATTATG CATCAACAGG 7650  
TATTGAGGAT ATTGTACTTG ACATTGTCAC TAATAATGGA TTAATTATAA CAACAAGGTT 7710  
TACAAATAAT AATATAACTT TTGATAAACC GTATGCAGCA TTGTATCCAT CAGTGGGACC 7770  
AGGAATCTAT TATAAGGATA AAGTTATATT TCTCGGATAT GGAGGTCTAG AGCATGAAGA 7830  
AAACGGGAGAC GTAATATGTA ATACAACCTGG TTGTCCTGGC AAAACACAGA GAGACTGTAA 7890  
TCAGGCTTCT TATAGCCCAT GGTTCTCAAA TAGGAGAATG GTAAACTCTA TTATTGTTGT 7950  
TGATAAAGGC ATAGATGCAA CTTTTAGCTT GAGGGTG TGG ACTATTCCAA TGAGCCAAAA 8010  
TTATTGGGGA TCAGAAGGAA GATTACTTTT ATTAGGTGAC AGAATATACA TATATACTAG 8070  
ATCCACAAGT TGGCACAGTA AATTACAGTT AGGGGTAATT GATATTTCTG ATTATACTAA 8130  
TATAAGAATA AATTGGACTT GGCATAATGT ACTATCAGG CCAGGGAATG ATGAAATGTCC 8190  
ATGGGGTCAT TCATGCCAG ACGGATGTAT AACAGGAGTT TACACTGATG CATATCCGCT 8250  
AAACCCATCG GGGAGTGTTG TATCATCAGT AATTCTTGAT TCACAAAAGT CTAGAGAAAA 8310  
CCCAATCATT ACTTACTCAA CAGCTACAAA TAGAATAAAT GAATTAGCTA TATATAACAG 8370  
AACACTTCCA GCTGCATATA CAACAACAAA TTGTATACA CATTATGATA AAGGGTATTG 8430  
TTTTCATATA GTAGAAATAA ATCACAGAAG TTTGAATACG TTTCAACCTA TGTTATTCAA 8490  
AACAGAAGTT CCAAAAAACT GCAGCTAAAT TGATCATCGC ATATCGGATG CAAGATGACA 8550  
TTAAAGAGA CCACCAGACA GACAACACAG GAGACGATGC AAGATATAAA GAAATAATAA 8610  
AAAACCTAGG AGAAAAGTGT GCAAGAAAAA TGGACACCGA GTCCACAGC GGCACAAAT 8670  
CTGACATTCT GTACCCTGAA TGTCACCTCA ATTCTCC TAT AGTTAAAGGA AAGATAGCAC 8730  
AACTGCATAC AATAATGAGT TTGCCTCAGC CCTACGATAT GGATGATGAT TCAATACTGA 8790  
TTATTACTAG ACAAAAAATT AAACCTCAATA AATTAGATAA AAGACAACGG TCAAT TAGGA 8850  
AATTAAGATC AGTCTTAATG GAAAGAGTAA GTGATCTAGG TAAATATACC TTTATCAGAT 8910  
ATCCAGAGAT GTCTAGTGAA ATGTTCCAAT TATGTATACC CGGAATTAAT AATAAAATAA 8970  
ATGAATTGCT AAGTAAAGCA AGTAAACAT ATAATCAAAT GACTGATGGA TTAAGAGATC 9030  
TATGGGTTAC TATACTATCG AAGTTAGCAT CGAAAAA TGA TGGAAAGTAAT TATGATATCA 9090  
ATGAAGATAT TAGCAATATA TCAATGTTC ACATGACTTA TCAATCAGAC AAATGGTATA 9150  
ATCCATTCAA GACATGGTTT ACTATTAAGT ATGACATGAG AAGATTACAA AAAGCCAAAA 9210  
ATGAGATTAC ATTCAATAGG CATAAAGATT ATAATCTATT AGAAGACCAA AAGAAATATAT 9270  
TGCTGATACA TCCAGAACTC GTCTTAATAT TAGATAACA AAATTACAAT GGGTATATAA 9330  
TGACTCCTGA ATTGGTACTA ATGTATTGTG ATGTAGT TGA AGGGAGGTGG AATATAAGTT 9390  
CATGTGCAAA 9400

FIGURE 1D



SEQ ID NO: 35

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ATTGGATCCT AAGTTACAA T CAATGTATTA TAAGGGTAAC AATTTATGGG AAATAATAGA 9460
TGGACTATT CCGACCTTAG GAGAAAGAAC ATTTGACATA ATATCACTAT TAGAACCACT 9520
TGCATTATCG CTCATTCAA CTTATGACCC GGTAAAAAG CTCAGGGGGG CTTTTTAAAA 9580
TCACGTGTTA TCAGAAATGG AATTAATATT TGCAGCTGAG TGTACAACAG AGGAAATACC 9640
TAATGTGGAT TATATAGATA AAATTTTAGA TGTGTTCAA GAATCAACAA TAGATGAAAT 9700
AGCAGAAATT TTCTCTTCT TCCGAACCTT TGGACACCCT CCATTAGAGG CGAGTATAGC 9760
AGCAGAGAAA GTTAGAAAGT ATATGTATAC TGAGAAA TGC TTGAAATTG ATACTATCAA 9820
TAAATGTCAT GCTATTTTT GTACAATAAT TATAAATGGA TATAGAGAAA GACATGGTGG 9880
TCAATGGCCT CCAGTTACAT TACCTGTCCA TGCACATGAA TTTATCATAA ATGCA TACGG 9940
ATCAAATTCT GCCATATCAT ATGAGAATGC TGTAGAT TAT TATAAGAGCT TCATAGGAAT 10000
AAAATTGAC AAGTTTATAG AGCCTCAATT GGATGAAGAC TTAATATTTT ATATGAAAGA 10060
TAAAGCATT TCCCAAGA AATCAAACTG GGACACAGTC TATCCAGCTT CAAACCTGTT 10120
ATACCGCACT AATGTGTCTC ATGATTCACG AAGATTGTT GAAGTATTTA TAGCAGATAG 10180
TAAATTGAT CCCCACCAAG TATTAGATTA CGTAGAA TCA GGATATTGGC TGGATGATCC 10240
TGAATTTAAT ATCTCATATA GTTTAAAGA GAAAGAAATA AAACAAGAAG GTAGACTTTT 10300
TGCAAAAATG ACATACAAGA TGAGGGCTAC ACAAGTATTA TCAGAAACAT TATTGCGGAA 10360
TAATATAGGG AAATCTTCC AAGAGAATGG GATGGTTAAA GGAGAAATTG AATTAATCAA 10420
GAGACTAACA ACAATATCTA TGTCTGGAGT TCCGCGGTAT AATGAGGTAT ACAATAATTC 10480
AAAAAGTCAC ACAGAAGAAC TTCAAGCTTA TAATGCAATT AGCAGTTCCA ATTTA TCTTC 10540
TAATCAGAAG TCAAGAAGT TTGAATTAA ATCTACAGAT ATATACAATG ATGGA TACGA 10600
AACCCTAAGC TGCTTCTTAA CGACAGATCT TAAAAAAT TGTTTAAATT GGAGGTATGA 10660
ATCAACAGCT TTATTCGGTG ATACTTG TAA TCAGATATTT GGGTTAAAGG AATTATTTAA 10720
TTGGCTGCAC CCTCGCCTTG AAAAGAGTAC AATATATGTT GGAGATCCTT ATTGCCCGCC 10780
ATCAGATATT GAACATTAC CACTTGATGA CCATCCTGAT TCAGGATTTT ATGTT CATAA 10840
TCCTAAAGGA GGAATAGAAG GGTTTTGCCA AAAGTTATGG AACTCATAT CTATCAGTGC 10900
AATACATTTA GCAGCTGTCA AAATCGGTGT AAGAGTTACT GCAATGGTTC AAGGGGATAA 10960
TCAAGCCATA GCTGTTACCA CAAGAGTACC TAATAAT TAT GATTATAAAG TTAAGAAAGA 11020
GATTGTTTAT AAAGATGTGG TAAGATTTT TGATTCC TTG AGAGAGGTGA TGGATGATCT 11080
GGGTCAAGAG CTCAAACTAA ATGAACTAT AATAAGTAGT AAAA TGT TTA TATATAGCAA 11140
AAGGATATAC TATGACGGAA GAATCCTTCC TCAGGCA TTA AAAGCATTGT CTAGATGTGT 11200
TTTTTGGTCT GAAACAATCA TAGATGAGAC AAGATCAGCA TCCTCAAATC TGGCTACATC 11260
GTTTGCAAAG GCCATTGAGA ATGGCTACTC ACCTGTAT TG GGATATGTAT GCTCAATCTT 11320
CAAAAATATC CAACAGTTGT ATATAGCGCT TGGAATGAAT ATAAACCCAA CTATAACCCA 11380
AAATATTTAA GATCAATATT TCAGGAATAT TCATTGGATG CAATATGCCT CCTTAATCCC 11440
TGCTAGTGTC GGAGGATTTA ATTATATGGC CATGTCAAGG TGTTTTGTCA GAAACATTGG 11500
AGATCCTACA GTCGCTGCGT TAGCCGATAT TAAAAGATTT ATAAAAGCAA ATTTGTTAGA 11560
TCGAGGTGTC CTTTACAGAA TTATGAATCA AGAACCAAGG GAGTCTTCTT TTTTAGACTG 11620
GGCCTCAGAT CCCTATTCAT GTAACCTACC ACAATCTCAA AATATAACCA CCATGATAAA 11680
GAATATAACT GCAAGAAATG TACTACAGGA CTCACCAAC CCATTACTAT CTGGATTATT 11740
TACAAGTACA 11750
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FIGURE 1E



SEQ ID NO: 35

ATGATAGAAG AGGATGAGGA ATTAGCTGAG TTCCTAATGG ACAGGAGAAT AATCC TCCCA 11810  
AGAGTTGCAC ATGACATTTT AGATAATTCT CTTACTGGAA TTAGGAATGC TATAGCTGGT 11870  
ATGTTGGATA CAACAAAATC ACTAATTCGA GTAGGGA TAA GCAGAGGAGG ATTAACCTAT 11930  
AACTTATTAA GAAAGATAAG CAACTATGAT CTTGTACAAT ATGAGACACT TAGTAAACT 11990  
TTAAGACTAA TAGTCAGTGA CAAGATTAAG TATGAAGATA TGTGCTCAGT AGACC TAGCC 12050  
ATATCATTAA GACAAAAAT GTGGATGCAT TTATCAGGAG GAAGAATGAT AAATGGACTT 12110  
GAAACTCCAG ATCCTTTAGA GTTACTGTCT GGAGTAA TAA TAACAGGATC TGAACATTGT 12170  
AGGATATGTT ATTCAACTGA AGGTGAAAGC CCATATACAT GGATGTATTT ACCAGGCAAT 12230  
CTTAATATAG GATCAGCTGA GACAGGAATA GCATCAT TAA GGGTCCCTTA CTTTGATCA 12290  
GTTACAGATG AGAGATCTGA AGCACAATTA GGGTATA TCA AAAATCTAAG CAAAC CAGCT 12350  
AAGGCTGCTA TAAGAATAGC AATGATATAT ACTTGGGCAT TTGGGAATGA CGAAATATCT 12410  
TGGATGGAAG CATCACAGAT TGCACAAACA CGTGCAA ACT TTACATTGGA TAGCT TAAAG 12470  
ATTTTGACAC CAGTGACAAC ATCAACAAAT CTATCAC ACA GGTTAAAGA TACTGCTACT 12530  
CAGATGAAAT TTTCTAGTAC ATCACTTATT AGAGTAAGCA GGTTCATCAC AATATCTAAT 12590  
GATAATATGT CTATTAAAGA AGCAAATGAA ACTAAAGATA CAAATCTTAT TTATCAACAG 12650  
GTAATGTTAA CAGGATTAAG TGTATTTGAA TATCTAT TTA GGTTAGAGGA GAGTACAGGA 12710  
CATAACCCTA TGGTCATGCA TCTACATATA GAGGATGGAT GTTGATATAA AGAGAGTTAC 12770  
AATGATGAGC ATATCAATCC GGAGTCTACA TTAGAGTTAA TCAAATACCC TGAGAGTAAT 12830  
GAATTTATAT ATGATAAGGA CCCTTTAAAG GATATAGATC TATCAAAAT AATGGTTATA 12890  
AGAGATCATT CTTATACAA TGCATGAAT TACTGGGATG ACACAGATAT TGTACATGCA 12950  
ATATCAATAT GTACTGCAGT TACAATAGCA GATACAA TGT CGCAGCTAGA TCGGGATAAT 13010  
CTTAAGGAGC TGGTTGTGAT TGCAAATGAT GATGATATTA ACAGTCTGAT AACTGAA TTT 13070  
CTGACCCTAG ATATACTAGT GTTTCTCAA ACATTTGGAG GGTTACTCGT GAATCAATTT 13130  
GCATATACCC TTTATGGATT GAAAATAGAA GGAAGGGATC CCATTTGGGA TTATA TAATG 13190  
AGAACATTAA AAGACACCTC ACATTCAGTA CTTAAAGTAT TATCTAATGC ACTATCTCAT 13250  
CCAAAAGTGT TTAAGAGATT TTGGGATTGT GGAGTTT TGA ATCCTATTTA TGGTCTAAT 13310  
ACTGCTAGTC AAGATCAAGT TAAGCTTGCT CTCTCGATTT GCGAGTACTC CTTGGATCTA 13370  
TTTATGAGAG AATGGTTGAA TGGAGCATCA CTTGAGATCT ATATCTGTGA TAGTGACATG 13430  
GAAATAGCAA ATGACAGAAG ACAAGCATTT CTCTCAAGAC ATCTTGCCCT TGTGTGTTGT 13490  
TTAGCAGAGA TAGCATCTTT TGGACCAAAT TTATTAAATC TAACATATCT AGAGAGACTT 13550  
GATGAATTAA AACAATACTT AGATCTGAAC ATCAAAGAAG ATCCTACTCT TAAATATGTG 13610  
CAAGTATCAG GACTGTTAAT TAAATCATTC CCCTCAA CTG TTACGTATGT AAGGAAA ACT 13670  
GCGATTAAGT ATCTGAGGAT TCGTGGTATT AATCCGCCCTG AAACGATTGA AGATTGGGAT 13730  
CCCATAGAAG ATGAGAATAT CTTAGACAAT ATTGTTAAAA CTGTAAATGA CAATTGCAGT 13790  
GATAATCAAA AGAGAAATAA AAGTAGTTAT TTCTGGGGAT TAGCTCTAAA GAATTATCAA 13850  
GTCGTGAAAA TAAGATCCAT AACGAGTGAT TCTGAAGTTA ATGAAGCTTC GAATGTTACT 13910  
ACACATGGAA TGACACTTCC TCAGGGAGGA AGTTATCTAT CACATCAGCT GAGGT TATTT 13970  
GGAGTAAACA GTACAAGTTG TCTTAAAGCT CTTGAAT TAT CACAAATCTT AATGAGGGAA 14030  
GTTAAAAAAG ATAAAGATAG ACTCTTTTGA GGAGAAGGAG CAGGAGCTAT GTTAGCATGT 14090  
TATGATGCTA 14100

FIGURE 1F



SEQ ID NO: 35

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CACTCGGTCC TGCAATAAAT TATTATAATT CTGGTTTAAA TATTACAGAT GTAAT TGGTC 14160
AACGGGAATT AAAAATCTTC CCATCAGAAG TATCATTAGT AGGTAAAAAA CTAGGAAATG 14220
TAACACAGAT TCTTAATCGG GTGAGGGTGT TATTTAA TGG GAATCCCAAT TCAACATGGA 14280
TAGGAAATAT GGAATGTGAG AGTTTAATAT GGAGTGAATT AAATGATAAG TCAATTGGTT 14340
TAGTACATTG TGACATGGAG GGAGCGATAG GCAAAATCAGA AGAAACTGTT CTACA TGAAC 14400
ATTATAGTAT TATTAGGATT ACATATTTAA TCGGGGA TGA TGATGTTGTC CTAGTATCAA 14460
AAATTATACC AACTATTACT CCGAATTGGT CTAAAAT ACT CTATCTATAC AAGTTGTATT 14520
GGAAGGATGT AAGTGTAGTG TCCCTTAAAA CATCCAA TCC TGCCTCAACA GAGCTTTATT 14580
TAATTTCAAA AGATGCTTAC TGTACTGTAA TGGAAACCAG TAATCTTGTT TTATCAAAAC 14640
TTAAAAGGAT ATCATCAATA GAAGAAAATA ATCTATTAAA GTGGATAATC TTATCAAAAA 14700
GGAAGAATAA CGAGTGGTTA CAGCATGAAA TCAAAGAAGG AGAAAGGGAT TATGGGATAA 14760
TGAGGCCATA TCATACAGCA CTGCAAATTT TTGGATTCCA AATTAACCTA AATCACTTAG 14820
CTAGAGAATT TTTATCAACT CCTGATTTAA CCAACAT TAA TAATATAATT CAAAGTTTTA 14880
CAAGAACAAT TAAAGATGTT ATGTTTGAAT GGGTCAA TAT CACTCATGAC AATAAAGAC 14940
ATAAATTAGG AGGAAGATAT AATCTATTCC CGCTTAAAA TAAGGGGAAA TTAAGATTAT 15000
TATCAGGAAG ATTAGTACTA AGCTGGATAT CATTATCCTT ATCAACCAGA TTACTGACGG 15060
GCCGTTTTCC AGATGAAAAA TTTGAAAATA GGGCACAGAC CGGATATGTA TCATTGGCTG 15120
ATATTGATTT AGAATCCTTA AAGTTATTAT CAAGAAATAT TGTCAAAAAT TACAAAGAAC 15180
ACATAGGATT AATATCATAC TGGTTTTTGA CCAAAGAGGT CAAAATACTA ATGAAGCTTA 15240
TAGGAGGAGT CAAACTACTA GGAATTCCTA AACAGTACAA AGAGTTAGAG GATCGATCAT 15300
CTCAGGGTTA TGAATATGAT AATGAATTTG ATATTGATTA ATACATAAAA ACATAAAATA 15360
AAACACCTAT TCCTCACCCA TTCACTTCCA ACAAATGAA AAGTAAGAAA AACATGTAAT 15420
ATATATATAC CAAACAGAGT TTTTCTCTTG TTTGGT 15456
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FIGURE 1G



1 2 3 4 5 6 7 8 9 10 11 12 = 1234567

SEQ ID NO: 36

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ACCAAACAAG AGAAGAGACT TGCTTGGGAA TATTAAT TCA AATAAAAT AACTTAGGAT 60
TAAAGAACTT TACCGAAAGG TAAGGGGAAA GAAATCC TAA GACTGTAATC ATGTTGAGTC 120
TATTCGACAC ATTCAGTGCG CGTAGGCAGG AGAACAT AAC GAAATCAGCT GGTGGGGCTG 180
TTATTCCCGG GCAAAAAAAC ACTGTGTCTA TATTGTCTCT TGGACCATCA ATAACAGATG 240
ACAATGATAA AATGACATTG GCTCTTCTCT TTTTGTCTCA TTCTTTAGAC AATGAAAAGC 300
AGCATGCGCA AAGAGCTGGA TTTTGTAGTT CTCTGTTATC AATGGCTTAT GCCAACCAG 360
AATTATATTT AACATCAAA TGGTAGTAATG CAGATGT TAA ATATGTTATC TACATGATAG 420
AGAAAGACCC AGGAAGACAG AAATATGGTG GGTGTGT CGT CAAGACTAGA GAGATGGTTT 480
ATGAAAAGAC AACTGATTGG ATGTTCCGGA GTGATCT TGA GTATGATCAA GACAAATGT 540
TGCAAAATGG TAGAAGCACT TCTACAATCG AGGATCT TGT TCATACTTTT GGATA TCCAT 600
CGTGTCTTGG AGCCCTTATA ATCCAAGTTT GGATAATACT TGTTAAGGCT ATAACCAGTA 660
TATCAGGATT GAGGAAAGGA TTCTTTACTC GGTAGAAGC ATTCGACAA GATGGAACAG 720
TTAAATCCAG TCTAGTGTG AGCGGTGATG CAGTAGAACA AATTGGATCA ATTATGAGGT 780
CCCAACAGAG CTGTGTAACA CTCATGGTTG AAACACTGAT AACAATGAAC ACAGGCAGGA 840
ATGATCTGAC AACAATAGAA AAGAATATAC AGATTGTAGG AACTACATC AGAGATGCAG 900
GTCTTGCTTC ATTTTCAAC ACAATCAGAT ATGGCAT TGA GACTAGAATG GCAGCTCTAA 960
CTCTGTCTAC CCTTAGACCG GATATCAACA GACTCAAGGC ACTGATCGAG TTATATCTAT 1020
CAAAGGGGCC ACGTGCTCCT TTTATATGCA TTTTGAGAGA TCCCGTGCAT GGTGAGTTG 1080
CACCAGGCAA CTATCTGCC CTCTGGAGTT ATGCGATGGG TGTAGCAGTT GTACAAAACA 1140
AGGCCATGCA ACAGTATGTA ACAGGAAGGT CTTATCTGGA TATTGAAATG TTCCAATTG 1200
GTCAAGCAGT GGCACGTGAT GCCGAGTCGC AGATGAGTTC AATATTAGAG GATGAACTGG 1260
GGGTACACCA AGAAGCCAAG CAAAGCTTGA AGAAACA CAT GAAGAATC AGCAGTTCAG 1320
ATACAACCTT TCATAAGCCT ACAGGGGGAT CAGCCATAGA AATGGCGATA GATGAAGAAG 1380
CAGGGCAGCC TGAATCCAGA GGAGATCAGG ATCAAGGAGA TGAGCCTCGG TCATCATAG 1440
TTCCTTATGC ATGGGCAGAC GAAACCGGGA ATGACAATCA AACTGAATCA ACTACAGAAA 1500
TTGACAGCAT CAAACTGAA CAAAGAAACA TCAGAGACAG GCTGAACAAA AGACTCAACG 1560
AGAAAAGGAA ACAGAGTGAC CCGAGATCAA CTGACATCAC AAACAACACA AATCAAACCTG 1620
AAATAGATGA TTTGTTGAGT GCATTGCGAA GCAACTAGTC ACAAAGAGAT GACCACTATC 1680
ACCAGCAACA AGTAAGAAAA ACTTAGGATT AATGGAAATT ATCCAATCCA GAGACGGAAG 1740
GACAAATCCA GAATCCAACC ACAACTCAAT CAACCAAAGA TTCATGGAAG ACAATGTTCA 1800
AAACAATCAA ATCATGGATT CTTGGGAAGA GGGATCAGGA GATAAATCAT CTGACATCTC 1860
ATCGGCCCTC GACATCATTG AATTCATACT CAGCACCAGC TCCCAAGAAA ACACGGCAGA 1920
CAGCAATGAA ATCAACACAG GAACCACAAG ACTTAGCAGC ACAATCTACC AACCTGAATC 1980
CAAAACAACA GAAACAAGCA AGGAAAATAG TGGACCAGCT AACAAAAATC GACAGTTTGG 2040
GGCATCACAC GAACGTGCCA CAGAGACAAA AGATAGAAAT GTTAATCAGG AGACTGTACA 2100
GGGAGGATAT AGGAGAGGAA GCAGCCCAGA TAGTAGAACT GAGACTATGG TCACTCGAAG 2160
AATCTCCAGA AGCAGCCCAG ATCCTAACAA TGGAACCAA ATCCAGGAAG ATATTGATTA 2220
CAATGAAGTT GGAGAGATGG ATAAGGACTC TACTAAGAGG GAAATGCGAC AATTTAAAGA 2280
TGTTCAGTC AAGGTATCAG GAAGTGATGC CATTCTCCA ACAAACAAG ATGGAGACGG 2340
TGATGATGGA 2350
```

FIGURE 2A





SEQ ID NO: 36

AGAGGCCTGG AATCTATCAG TACATTTGAT TCAGGATATA CCAGTATAGT GACTG CCGCA 2410  
ACACTAGATG ACGAAGAAGA ACTCCTTATG AAGAACAACA GGCCAAGAAA GTATC AATCA 2470  
ACACCCCAAG ACAGTGACAA GGAATTAA AAGGGGTTG GAAGGCCAAA AGACA CAGAC 2530  
AAACAATCAT CAATATTGGA CTACGAACTC AACTTCAAAG GATCGAAGAA GAGCCAGAAA 2590  
ATCCTCAAAG CCAGCACGAA TACAGGAGAA CCAACAAGAC CACAGAATGG ATCCAGGGG 2650  
AAGAGAATCA CATCCTGGAA CATCCTCAAC AGCGAGAGCG GCAATCGAAC AGAAT CAACA 2710  
AACCAAACCC ATCAGACATC AACCTCGGGA CAGAACCAACA CAATGGGACC AAGCA GAACA 2770  
ACCTCCGAAC CAAGGATCAA GACACAAAAG ACGGATGGA AGGAAAGAGA GGACA CAGAA 2830  
GAGAGCACTC GATTACAGA AAGGGCGATT ACATTAT TAC AGAATCTTGG TGTAATCCAA 2890  
TCTGCAGCAA AATTAGACCT ATACCAAGAC AAGAGAGTTG TGTGTGTGGC GAATG TCCTA 2950  
AACAAATGCAG ATACTGCATC AAAGATAGAC TTCCTAGCAG GTTTGATGAT AGGAGTGTCA 3010  
ATGGATCATG ATACCAAAT AAATCAGATT CAGAACGAGA TATTAAGTTT GAAAA CTGAT 3070  
CTTAAAAAGA TGGATGAATC ACATAGAAGA CTAATTGAGA ATCAAAAAGA ACAAT TATCA 3130  
CTGATCACAT CATTAAATCTC AAATCTTAAA ATTATGACAG AGAGAGGAGG GAAGA AGGAC 3190  
CAACCAGAAC CTAGCGGGAG GACATCCATG ATCAAGACAA AAGCAAAAAGA AGAGAAAAATA 3250  
AAGAAAGTCA GGTGTTGACC TCTTATGGAA ACACAGGGCA TCGAGAAAAA CATCC CTGAC 3310  
CTCTATAGAT CAATAGAGAA AACACCAGAA AACGACACAC AGATCAAATC AGAAA TAAAC 3370  
AGATTGAATG ATGAATCCAA TGCCACTAGA TTAGTACCTA GAAGAATAAG CAGTACAATG 3430  
AGATCATTA TAATAATCAT TAACAACAGC AATTTATCAT CAAAAGCAAA GCAAT CATA 3490  
ATCAACGAAC TCAAGCTCTG CAAGAGTGAC GAGGAAGTGT CTGAGTTGAT GGACA TGTTT 3550  
AATGAGGATG TCAGCTCCCA GTAAACCGCC AACCAAGGGT CAACACCAAG AAAAC CAATA 3610  
GCACAAAACA GCCAATCAGA GACCACCCCA ATACACCAAA CCAATCAACA CATAA CAAAG 3670  
ATCTCCAGAT CATAGATGAT TAAGAAAAAC TTAGGATGAA AGGACTAATC AATCC TCCGA 3730  
AACAAATGAGC ATCACCACCT CCACAATCTA CACATTCCCA GAATCCTCTT TCTCC GAGAA 3790  
TGGCAACATA GAGCCGTTAC CACTCAAGGT CAATGAACAG AGAAAGGCCA TACCTCATAT 3850  
TAGGGTTGTC AAGATAGGAG ATCCGCCCAA ACATGGATCC AGATATCTGG ATGTC TTTTT 3910  
ACTGGGCTTC TTTGAGATGG AAAGGTCAAA AGACAGGTAT GGGAGCATAA GTGAT CTAGA 3970  
TGATGATCCA AGTTACAAGG TTTGTGGCTC TGGATCATG CCACTTGGGT TGGCT AGATA 4030  
CACCAGAAAT GATCAGGAAC TCCTACAGGC TGCAACCAAG CTCGATATAG AAGTAAGAAG 4090  
AACTGTAAAG GCTACGGAGA TGATAGTTTA CACTGTACAA AACATCAAAC CTGAA CTATA 4150  
TCCATGGTCC AGTAGATTAA GAAAAGGGAT GTTATTTGAC GCTAATAAGG TTGCA CTGTC 4210  
TCCTCAATGT CTTCCACTAG ATAGAGGGAT AAAATTCAGG GTGATATTTG TGAAGTGCAC 4270  
AGCAATTGGA TCAATAACTC TATTCAAAT CCCTAAGTCC ATGGCATTGT TATCA TTGCC 4330  
TAATACAATA TCAATAAATC TACAAGTACA TATCAAAAACA GGAGTTCAGA CAGAT TCCAA 4390  
AGGAGTAGTT CAGATTCTAG ATGAAAAAGG TGAAAAATCA CTAAATTTCA TGGTT CATCT 4450  
CGGGTTGATC AAAAGGAAGA TGGGCAGAA GTACTCAGTT GAATATTGTA AGCAG AAGAT 4510  
CGAGAAGATG AGATTATTAT TCTCATTGGG ATTAGTTGGA GGGATCAGCT TCCAG GTCAA 4570  
CGCAACTGGC TCTATATCAA AGACATTAGC AAGTCAATTA GCATTCAAAA GAGAAATCTG 4630  
CTATCCCTA ATGGATCTGA ATCCACACTT AAATTCAGTT ATATGGGCAT CATCAGTTGA 4690  
AATTACAAGG 4700

FIGURE 2B



SEQ ID NO: 36

G TAGATGCAG TTCTCCAGCC TTCATTACCT GCGAAT TCA GATACTACCC AAACATCATA 4760  
G CAAAAGGGG TCGGGAAAA T CAGACAGTAA AATCAAC AAC CCTGATATCC AACAT TGCAA 4820  
A TCAGGCTAC CCACAGGAGA AAAATCAAAA ACTTAGGATC AAAGGGATCA CCACG AACCC 4880  
C GGAAAACAG CCAAACAAAC CAACACACAA ATCAGAGACA AAAAGGAGAA GGCACTGCAA 4940  
A GACCGAGAA AAAACAGAAC GCACACAACC AAGCAGAGAA AAGCCAAAGC CCGCCATTCA 5000  
C AAACACACC AACATCCTG CAAACAAGCA CCAAAACAGA GTCAAAAGA CAAAGAGCAC 5060  
C AGATATGAC CATACAACC ACAATCATAG CCATATTACT AATACCCCA TCATT TTGTC 5120  
A AATAGACAT AACAAAAGT G CAACGTGTAG GTGTGTTAGT CAACAATCCT AAAGGCATGA 5180  
A GATTTTACA AAATTTGAA ACGAGATACC TGATATTAG TTTGATACCC AAAATAGAGA 5240  
A TTCACACTC ATGTGGGGAT CAACAGATAA ACCAATA CAA GAAGTTATTG GATAGATTGA 5300  
T AATTCCTCT ATATGATGGA TTAAAATTAC AAAAAGATGT AATAGTAGTA AGTCATGAAA 5360  
C CCCACAACAA TACTAATCTT AGGACAAAAC GATTCTT TGG AGAGATAATT GGGACAATTG 5420  
C GATAGGGAT AGCCACTTCA GCACAAATCA CCGCAGCAGT CGCTCTTGTC GAAGCTAAAC 5480  
A AGGCAAAGTC AGACATAGAA AAACCTCAAAG AGGCTATAG AGACACAAAC AAGGCAGTAC 5540  
A ATCGATTCA AAGTTCTGTA GGTAACCTAA TTGTTGCA GT TAAATCAGTT CAAGACTATG 5600  
T CAACAATGA AATTATACCT TCAATCACAA GATTAGGCTG TGAAGCAGCA GGGTTACAA 5660  
T TGGGAATTGC ATTGACACAA CATTACTCAG AATTAACAAA TATATTGGT GATAATATAG 5720  
G AACACTGAA AGAAAAAGGG ATAAAATTAC AAGGGATAGC ATCATTATAT CACACAAACA 5780  
T TAACGGAAT ATTTACTACT TCAACAGTTG ACCAATA TGA TATTATGAC CTATTATTCA 5840  
C TGAGTCAAT CAAGATGAGA GTGATAGATG TTGATTGAG TGATTACTCA ATTACTCTTC 5900  
A AGTTAGACT TCCTTTATTA ACTAAACTAT CAAATAC TCA AATTATATAA GTAGATTCTA 5960  
T ATCATACAA CATCCAGGGC AAAGAGTGGT ATATTCCTCT TCCCAATCAC ATCATGACAA 6020  
A AAGGGGCTTT TCTAGGTGGT GCTGATATTA AAGAATGCAT AGAGGCATTG AGCAGTTATA 6080  
T ATGTCCTTC TGATCCAGGT TACATATTAA ATCAGAGAT AGAGAATTGT TTATCAGGGA 6140  
A ACATAACACA GTGTCCTAAG ACTGTTGTTA CATCAGATGT GGTACCACGA TACGCGTTTG 6200  
T TGAATGGTGG ATTAATTGCA AACTGCATAA CAACTACATG TACATGCAAT GGAATTGACA 6260  
A ATAGAATTAA TCAATCACCT GATCAAGGAA TTAAGATCAT AACACATAAA GAATGCCAGG 6320  
T TAATAGGTAT AAACGGAATG TTATTCAATA CTAATAGAGA AGGGACATTA GCAACTTATA 6380  
C CATTGATGA CATCATATTA AATAACTCTG TTGCACTTAA TCCAATTGAT ATATCTATGG 6440  
A AACTCAACAA GGCAAAACTA GAATTAGAAG AATCGAAGGA ATGGATAAAG AAATCAAATC 6500  
A AAAAGTTAGA TTCCGTGGGA AGTTGGTATC AATCTAGTGC AACCAATCACC ATAATCATAG 6560  
T TGATGATAAT AATTCTAGTT ATAATCAATA TAACAAT TAT TGTAGTCATA ATCAAATTCC 6620  
A ATAGAATTCA GGGGAAAGAT CAAAACGACA AAAACAGTGA GCCGTATATA CTGACAAATA 6680  
G GACAATAAGA CTATACACGA TCAAAATATAA AAAGTACAAA AAACCTAGGA ACAAAAGTTG 6740  
T TCAACACAGC AGCACCAGAT AGACCAAAAG GCAGCGCAGA GCGACACCA AACTCAAAAA 6800  
T TGGAATATTG GAAACACACA AACAGCATAA ATAACACCAA CAATGAAACC GAAACAGCCA 6860  
G GAGGCAACA TAGTAGCAAG GTTACAAATA TCATAATGTA CACCTTCTGG ACAATAACAT 6920  
T TAACAATATT ATCAGTCATT TTTATAATGA TATTGACAAA CTTAATTCAA GAGAACAAATC 6980  
A ATAATAAAT AATGTTGCAG GAAATAAGAA AAGAATTCG GCAATAGAC ACCAAGATTG 7040  
A GAGGACTTC 7050

FIGURE 2C



SEQ ID NO: 36

GGATGACATT GGAACCTCAA TACAGTCAGG AATAAATACA AGACTTCTCA CAATT CAGAG 7110  
TCATGTTCAA AACTATATCC CACTATCATT AACACAA CAA ATGTCAGATC TCAGAAAATT 7170  
TATCAATGAT CTAACAAATA AAAGAGAACA TCAAGAA GTG CCAATACAGA GAATG ACTCA 7230  
TGATAGAGGT ATAGAACCCC TAAATCCAAA CAAGTT CTGG AGGTGTACAT CTGGTAAACC 7290  
ATCTCTAACA AGTAGTCCTA AGATAAGGTT AATACCAGGA CCAGGTTTAT TAGCAACATC 7350  
TACTACAGTA AATGGCTGTA TTAGAATTCC ATCGTTAGTA ATCAATCATC TAATC TATGC 7410  
TTACACCTCT AATCTTATTA CCCAGGCTG TCAAGATATA GGGAAATCTT ACCAAGTACT 7470  
ACAAATAGGG ATAATTACTA TAAATTCGGA CCTAGTACCT GATTTAAACC CCAGAGTCAC 7530  
ACATACATTT AATATTGATG ATAATAGAAG ATCTTGCTCT CTGGCACTAT TGAATACAGA 7590  
TGTTTATCAG TTATGCTCAA CACCAAAAGT TGATGAAAGA TCCGATTATG CATCAACAGG 7650  
TATTGAGGAT ATTGTACTTG ACATTGTCAC TAATAAT GGA TTAATTATAA CAACAAGGTT 7710  
TACAAATAAT AATATAACTT TTGATAAACC GTATGCAGCA TTGTATCCAT CAGTGGGACC 7770  
AGGAATCTAT TATAAGGATA AAGTTATATT TCTCGGATAT GGAGGTCTAG AGCATGAAGA 7830  
AAACGGAGAC GTAATATGTA ATACAACCTGG TTGTCCTGGC AAAACACAGA GAGACTGTAA 7890  
TCAGGCTTCT TATAGCCCAT GGTTCCTCAA TAGGAGAATG GTAAACTCTA TTATTGTTGT 7950  
TGATAAAGGC ATAGATGCAA CTTTTAGCTT GAGGGTG TGG ACTATTCCAA TGAGCCAAAA 8010  
TTATTGGGGA TCAGAAGGAA GATTACTTTT ATTAGGTGAC AGAATATACA TATATACTAG 8070  
ATCCACAAGT TGGCACAGTA AATTACAGTT AGGGGTAATT GATATTTCTG ATTATACTAA 8130  
TATAAGAATA AATTGGACTT GGCATAATGT ACTATCA CGG CCAGGGAATG ATGAA TGTCC 8190  
ATGGGGTCAT TCATGCCCAG ACGGATGTAT AACAGGAGTT TACACTGATG CATATCCGCT 8250  
AAACCCATCG GGGAGTGTTG TATCATCAGT AATTCTTGAT TCACAAAAGT CTAGAGAAAA 8310  
CCCAATCATT ACTTACTCAA CAGCTACAAA TAGAATAAAT GAATTAGCTA TATATAACAG 8370  
AACACTTCCA GCTGCATATA CAACAACAAA TTGTATCACA CATTATGATA AAGGGTATTG 8430  
TTTTCATATA GTAGAAATAA ATCACAGAAG TTTGAATACG TTTCAACCTA TGTTATTCAA 8490  
AACAGAAGTT CCAAAAAACT GCAGCTAAAT TGATCATCGC ATATCGGATG CAAGATGACA 8550  
TTAAAAGAGA CCACCAGACA GACAACACAG GAGACGATGC AAGATATAAA GAAATAATAA 8610  
AAAACTTAGG AGAAAAGTGT GCAAGAAAAA TGGACAC CGA GTCCCACAGC GGCACAACAT 8670  
CTGACATTCT GTACCCTGAA TGTCACTCA ATTCTCC TAT AGTTAAAGGA AAGATAGCAC 8730  
AACTGCATAC AATAATGAGT TTGCCTCAGC CCTACGATAT GGATGATGAT TCAATACTGA 8790  
TTATTACTAG ACAAAAAATT AACTCAATA AATTAGATAA AAGACAACGG TCAATTAGGA 8850  
AATTAAGATC AGTCTTAATG GAAAGAGTAA GTGATCTAGG TAAATATACC TTTATCAGAT 8910  
ATCCAGAGAT GTCTAGTGAA ATGTTCCAAT TATGTATACC CGGAATTAAT AATAAAATAA 8970  
ATGAATTGCT AAGTAAAGCA AGTAAACAT ATAATCAAAT GACTGATGGA TTAAGAGATC 9030  
TATGGGTTAC TATACTATCG AAGTTAGCAT CGAAAAA TGA TGGAAAGTAAT TATGATATCA 9090  
ATGAAGATAT TAGCAATATA TCAATGTTC ACATGACTTA TCAATCAGAC AAATGGTATA 9150  
ATCCATTCAA GACATGGTTT ACTATTAAGT ATGACATGAG AAGATTACAA AAAGCCAAAA 9210  
ATGAGATTAC ATTCAATAGG CATAAAGATT ATAATCTATT AGAAGACCAA AAGAA TATAT 9270  
TGCTGATACA TCCAGAACTC GTCTTAATAT TAGATAAACA AAATTACAAT GGGTATATAA 9330  
TGACTCCTGA ATTGGTACTA ATGTATTGTG ATGTAGT TGA AGGGAGGTGG AATATAAGTT 9390  
CATGTGCAAA 9400

FIGURE 2D



SEQ ID NO: 36

ATTGGATCCT AAGTTACAA T CAATGTATTA TAAGGGT AAC AATTTATGGG AAATAATAGA 9460  
TGGACTATTC TCGACCTTAG GAGAAAGAAC ATTTGACATA ATATCACTAT TAGAACCACT 9520  
TGCATTATCG CTCATTCAAA CTTATGACCC GGTTAAA CAG CTCAGGGGGG CTTTTTTAAA 9580  
TCACGTGTTA TCAGAAATGG AATTAATATT TGCAGCTGAG TGTACAACAG AGGAAATACC 9640  
TAATGTGGAT TATATAGATA AAATTTTAGA TGTGTTTCAA GAATCAACAA TAGATGAAAT 9700  
AGCAGAAATT TTCTCTTTCT TCCGAACCTT TGGACAC CCT CCATTAGAGG CGAGTATAGC 9760  
AGCAGAGAAA GTTAGAAAGT ATATGTATAC TGAGAAA TGC TTGAAATTTG ATACTATCAA 9820  
TAAATGTCAT GCTATTTTTT GTACAATAAT TATAAATGGA TATAGAGAAA GACATGGTGG 9880  
TCAATGGCCT CCAGTTACAT TACCTGTCCA TGCACAT GAA TTTATCATAA ATGCA TACGG 9940  
ATCAAATTCT GCCATATCAT ATGAGAATGC TGTAGAT TAT TATAAGAGCT TCATAGGAAT 10000  
AAAATTTGAC AAGTTTATAG AGCCTCAATT GGATGAAGAC TTAATATTTT ATATGAAAGA 10060  
TAAAGCATT TCCCCAAAGA AATCAAATG GGACACAGTC TATCCAGCTT CAAACCTGTT 10120  
ATACCGCACT AATGTGTCTC ATGATTACAG AAGATTGTT GAAGTATTTA TAGCAGATAG 10180  
TAAATTTGAT CCCCACCAAG TATTAGATTA CGTAGAATCA GGATATTGGC TGGATGATCC 10240  
TGAATTTAAT ATCTCATATA GTTTAAAAGA GAAAGAAATA AAACAAGAAG GTAGACTTTT 10300  
TGCAAAAATG ACATACAAGA TGAGGGCTAC ACAAGTATTA TCAGAAACAT TATTGCGGAA 10360  
TAATATAGGG AAATCTTCTC AAGAGAATGG GATGGTTAAA GGAGAAATTG AATTACTCAA 10420  
GAGACTAACA ACAATATCTA TGTCTGGAGT TCCGCGGTAT AATGAGGTAT ACAATAATTC 10480  
AAAAAGTCAC ACAGAAGAAC TTCAAGCTTA TAATGCAATT AGCAGTTCCA ATTTATCTTC 10540  
TAATCAGAAG TCAAAGAAGT TTGAATTTAA ATCTACAGAT ATATACAATG ATGGA TACGA 10600  
AACCGTAAGC TGCTTCTTAA CGACAGATCT TAAAAAATAT TGTTTAAATT GGAGGTATGA 10660  
ATCAACAGCT TTATTCGGTG ATACTGTAA TCAGATATTT GGGTTAAAGG AATTATTTAA 10720  
TTGGCTGCAC CCTCGCCTTG AAAAGAGTAC AATATATGTT GGAGATCCTT ATTGC CCGCC 10780  
ATCAGATATT GAACATTTAC CACTTGATGA CCATCCTGAT TCAGGATTTT ATGTT CATAA 10840  
TCCTAAAGGA GGAATAGAAG GGTTTTGCCA AAAGTTA TGG AACTCATAT CTATCAGTGC 10900  
AATACATTTA GCAGCTGTCA AAATCGGTGT AAGAGTTACT GCAATGGTTC AAGGGGATAA 10960  
TCAAGCCATA GCTGTTACCA CAAGAGTACC TAATAAT TAT GATTATAAAG TTAAGAAAGA 11020  
GATTGTTTAT AAAGATGTGG TAAGATTTTT TGATTCC TTG AGAGAGGTGA TGGATGATCT 11080  
GGGTCATGAG CTCAACTAA ATGAACTAT AATAAGTAGT AAAATGTTTA TATATAGCAA 11140  
AAGGATATAC TATGACGGAA GAATCCTTCC TCAGGCA TTA AAAGCATTGT CTAGATGTGT 11200  
TTTTTGCTCT GAAACAATCA TAGATGAGAC AAGATCAGCA TCCTCAAATC TGGCTACATC 11260  
GTTTGCAAAG GCCATTGAGA ATGGCTACTC ACCTGTATTG GGATATGTAT GCTCAATCTT 11320  
CAAAAATATC CAACAGTTGT ATATAGCGCT TGGAATGAAT ATAAACCCAA CTATAACCCA 11380  
AAATATTTAA GATCAATAT T TCAGGAATAT TCATTGGATG CAATATGCCT CCTTAATCCC 11440  
TGCTAGTGTC GGAGGATTTA ATTATATGGC CATGTCAAAG TGTGTTGTCA GAAACATTGG 11500  
AGATCCTACA GTCGTCGCT TAGCCGATAT TAAAAGATTT ATAAAAGCAA ATTTGTTAGA 11560  
TCGAGGTGTC CTTTACAGAA TTATGAATCA AGAACCAGGC GAGTCTTCTT TTTTAGACTG 11620  
GGCCTCAGAT CCCTATTCAT GTAACCTACC ACAATCT CAA AATATAACCA CCATGATAAA 11680  
GAATATAACT GCAAGAAATG TACTACAGGA CTCACCAAAC CCATTACTAT CTGGATTATT 11740  
TACAAGTACA 11750

FIGURE 2E



SEQ ID NO: 36

ATGATAGAAG AGGATGAGGA ATTAGCTGAG TTCCTAA TGG ACAGGAGAAT AATCC TCCCA 11850  
AGAGTTGCAC ATGACATTTT AGATAATTCT CTTACTGGAA TTAGGAATGC TATAG CTGGT 11870  
ATGTTGGATA CAACAAAATC ACTAATTCGA GTAGGGA TAA GCAGAGGAGG ATTAACCTAT 11930  
AACTTATTAA GAAAGATAAG CAACTATGAT CTTGTACAAT ATGAGACACT TAGTAAACT 11990  
TTAAGACTAA TAGTCAGTGA CAAGATTAAG TATGAAGATA TGTGCTCAGT AGACC TAGCC 12050  
ATATCATTAAGACAAAAAT GTGGATGCAT TTATCAGGAG GAAGAATGAT AAATGGACTT 12110  
GAAACTCCAG ATCCTTTAGA GTTACTGTCT GGAGTAA TAA TAACAGGATC TGAACATTGT 12170  
AGGATATGTT ATTCAACTGA AGGTGAAAGC CCATATACAT GGATGTATTT ACCAGGCAAT 12230  
CTTAATATAG GATCAGCTGA GACAGGAATA GCATCAT TAA GGGTCCCTTA CTTTGGATCA 12290  
GTTACAGATG AGAGATCTGA AGCACAATTA GGGTATATCA AAAATCTAAG CAAAC CAGCT 12350  
AAGGCTGCTA TAAGAATAGC AATGATATAT ACTTGGGCAT TTGGGAATGA CGAAATATCT 12410  
TGGATGGAAG CATCACAGAT TGCACAAACA CGTGCAA ACT TTACATTGGA TAGCT TAAAG 12470  
ATTTTGACAC CAGTGACAAC ATCAACAAAT CTATCACACA GGTTAAAGA TACTGCTACT 12530  
CAGATGAAAT TTTCTAGTAC ATCACTTATT AGAGTAAGCA GGTTCATCAC AATATCTAAT 12590  
GATAATATGT CTATTAAAGA AGCAAATGAA ACTAAAGATA CAAATCTTAT TTATCAACAG 12650  
GTAATGTTAA CAGGATTAAG TGTATTTGAA TATCTAT TTA GGTTAGAGGA GAGTACAGGA 12710  
CATAACCCTA TGGTCATGCA TCTACATATA GAGGATGGAT GTTGATATAA AGAGAGTTAC 12770  
AATGATGAGC ATATCAATCC GGAGTCTACA TTAGAGTTAA TCAAATACCC TGAGAGTAAT 12830  
GAATTTATAT ATGATAAGGA CCCTTTAAAG GATATAGATC TATCAAAATT AATGGTTATA 12890  
AGAGATCATT CTTATACAAT TGACATGAAT TACTGGGATG ACACAGATAT TGTACATGCA 12950  
ATATCAATAT GTACTGCAGT TACAATAGCA GATACAA TGT CGCAGCTAGA TCGGGATAAT 13010  
CTTAAGGAGC TGGTTGTGAT TGCAAATGAT GATGATATTA ACAGTCTGAT AACTGAA TTT 13070  
CTGACCCTAG ATATACTAGT GTTTCTCAAA ACATTTGGAG GGTACTCGT GAATCAATTT 13130  
GCATATACCC TTTATGGATT GAAAATAGAA GGAAGGGATC CCATTTGGGA TTATA TAATG 13190  
AGAACATTAA AAGACACCTC ACATTCAGTA CTTAAAGTAT TATCTAATGC ACTATCTCAT 13250  
CCAAAAGTGT TTAAGAGATT TTGGGATTGT GGAGTTT TGA ATCCTATTTA TGGTCTAAT 13310  
ACTGCTAGTC AAGATCAAGT TAAGCTTGCT CTCTCGATTT GCGAGTACTC CTTGGATCTA 13370  
TTTATGAGAG AATGGTTGAA TGGAGCATCA CTTGAGATCT ATATCTGTGA TAGTGACATG 13430  
GAAATAGCAA ATGACAGAAG ACAAGCATT TCTCAAGAC ATCTTGCCCTT TGTGTGTTGT 13490  
TTAGCAGAGA TAGCATCTTT TGGACCAAAT TTATTAAATC TAACATATCT AGAGAGACTT 13550  
GATGAATTAA AACAATACTT AGATCTGAAC ATCAAAGAAG ATCCTACTCT TAAATATGTG 13610  
CAAGTATCAG GACTGTTAAT TAAATCATTC CCCTCAACTG TTACGTATGT AAGGAAACT 13670  
GCGATTAAAT ATCTGAGGAT TCGTGGTATT AATCCGCCTG AAACGATTGA AGATTGGGAT 13730  
CCCATAGAAG ATGAGAATAT CTTAGACAAT ATTGTTAAAA CTGTAAATGA CAATTGCAGT 13790  
GATAATCAAA AGAGAAATAA AAGTAGTTAT TTCTGGGGAT TAGCTCTAAA GAATTATCAA 13850  
GTCGTGAAAA TAAGATCCAT AACGAGTGAT TCTGAAGTTA ATGAAGCTTC GAATGTTACT 13910  
ACACATGGAA TGACACTTCC TCAGGGAGGA AGTTATCTAT CACATCAGCT GAGGTATTT 13970  
GGAGTAAACA GTACAAGTTG TCTTAAAGCT CTTGAATAT CACAAATCTT AATGAGGGAA 14030  
GTTAAAAAAG ATAAAGATAG ACTCTTTTTA GGAGAAGGAG CAGGAGCTAT GTTAGCATGT 14090  
TATGATGCTA 14100

FIGURE 2F



SEQ ID NO: 36

```
CACTCGGTCC TGCAATAAAT TATTATAATT CTGGTTTAAA TATTACAGAT GTAAT TGGTC 14160
AACGGGAATT AAAAATCTTC CCATCAGAAG TATCATTAGT AGGTAAAAAA CTAGGAAATG 14220
TAACACAGAT TCTTAATCGG GTGAGGGTGT TATTTAATGG GAATCCCAAT TCAACATGGA 14280
TAGGAAATAT GGAATGTGAG AGTTTAAATAT GGAGTGAATT AAATGATAAG TCAATTGGTT 14340
TAGTACATTG TGACATGGAG GGAGCGATAG GCAAATCAGA AGAAACTGTT CTACA TGAAC 14400
ATTATAGTAT TATTAGGATT ACATATTTAA TCGGGGATGA TGATGTTGTC CTAGTATCAA 14460
AAATTATACC AACTATTACT CCGAATTGGT CTAAATACT CTATCTATAC AAGTTGTATT 14520
GGAAGGATGT AAGTGTAGTG TCCCTTAAAA CATCCAATCC TGCCTCAACA GAGCTTTATT 14580
TAATTTCAAA AGATGCTTAC TGTACTGTAA TGAACCCAG TAATCTTGTT TTATCAAAAC 14640
TTAAAAGGAT ATCATCAATA GAAGAAAATA ATCTATTAAA GTGGATAATC TTATCAAAAA 14700
GGAAGAATAA CGAGTGGTTA CAGCATGAAA TCAAAGAAGG AGAAAGGGAT TATGGGATAA 14760
TGAGGCCATA TCATACAGCA CTGCAAATTT TTGGATTCCA AATTAACCTA AATCACTTAG 14820
CTAGAGAATT TTTATCAACT CCTGATTTAA CCAACATTAA TAATATAATT CAAAGTTTAA 14880
CAAGAACAAT TAAAGATGTT ATGTTTGAAT GGGTCAATAT CACTCATGAC AATAAAAGAC 14940
ATAAATTAGG AGGAAGATAT AATCTATTCC CGCTTAAAAA TAAGGGGAAA TTAAGATTAT 15000
TATCACGAAG ATTAGTACTA AGCTGGATAT CATTATCCTT ATCAACCAGA TTAAGTACGG 15060
GCCGTTTTCC AGATGAAAAA TTTGAAAATA GGGCACAGAC CGGATATGTA TCATTGGCTG 15120
ATATTGATTT AGAATCCTTA AAGTTATTAT CAAGAAATAT TGTCAAAAAT TACAAAGAAC 15180
ACATAGGATT AATATCATAC TGGTTTTTGA CCAAAGAGGT CAAAATACTA ATGAAGCTTA 15240
TAGGAGGAGT CAAACTACTA GGAATTCCTA AACAGTACAA AGAGTTAGAG GATCGATCAT 15300
CTCAGGGTTA TGAATATGAT AATGAATTG ATATTGATTA ATACATAAAA ACATAAAATA 15360
AAACACCTAT TCCTCACCCA TTCACTTCCA ACAAATGAA AAGTAAGAAA AACATGTAAT 15420
ATATATATAC CAAACAGAGT TTTTCTCTTG TTTGGT 15456
```

FIGURE 2G



FIG. 3A

Mutagenesis to create restriction sites at start and stop condons of N

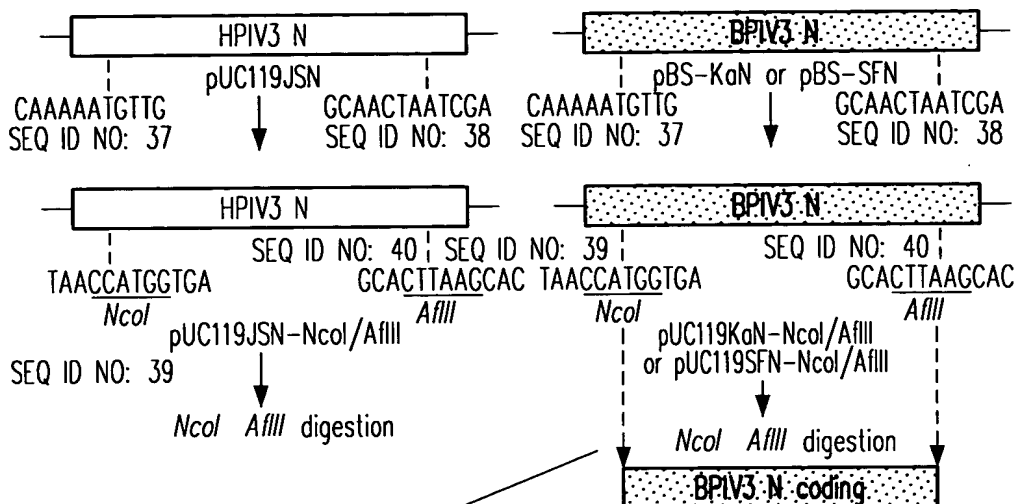


FIG. 3B

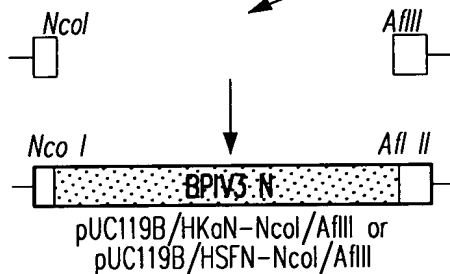
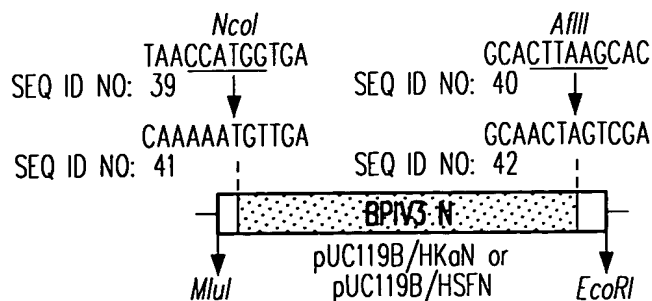


FIG. 3C

Mutagenesis to restore start and stop condon context



LEGEND

- BPIV3 sequence
- HPIV3 sequence



FIG. 4A

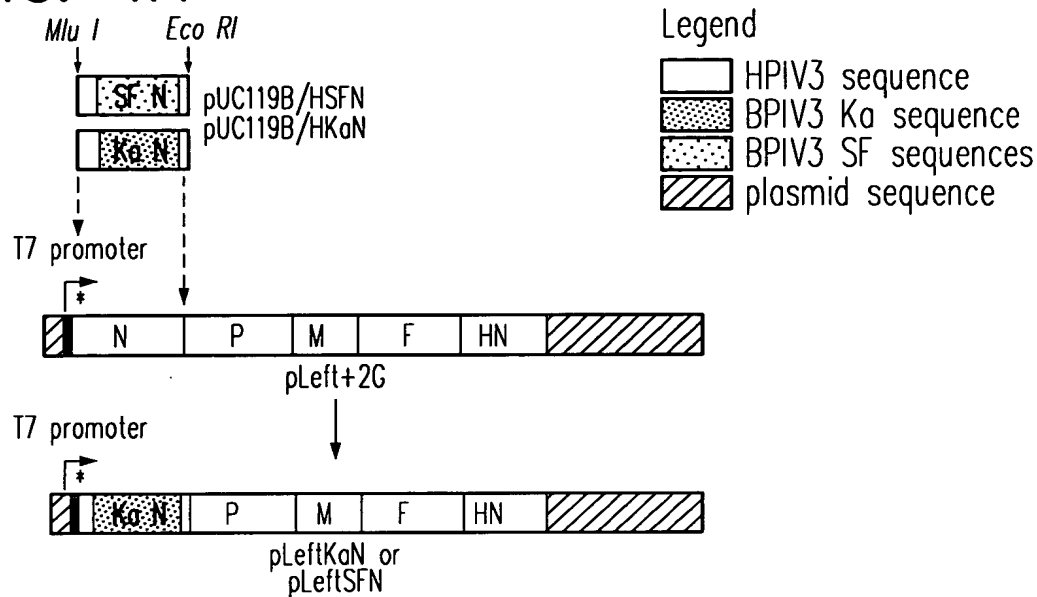


FIG. 4B

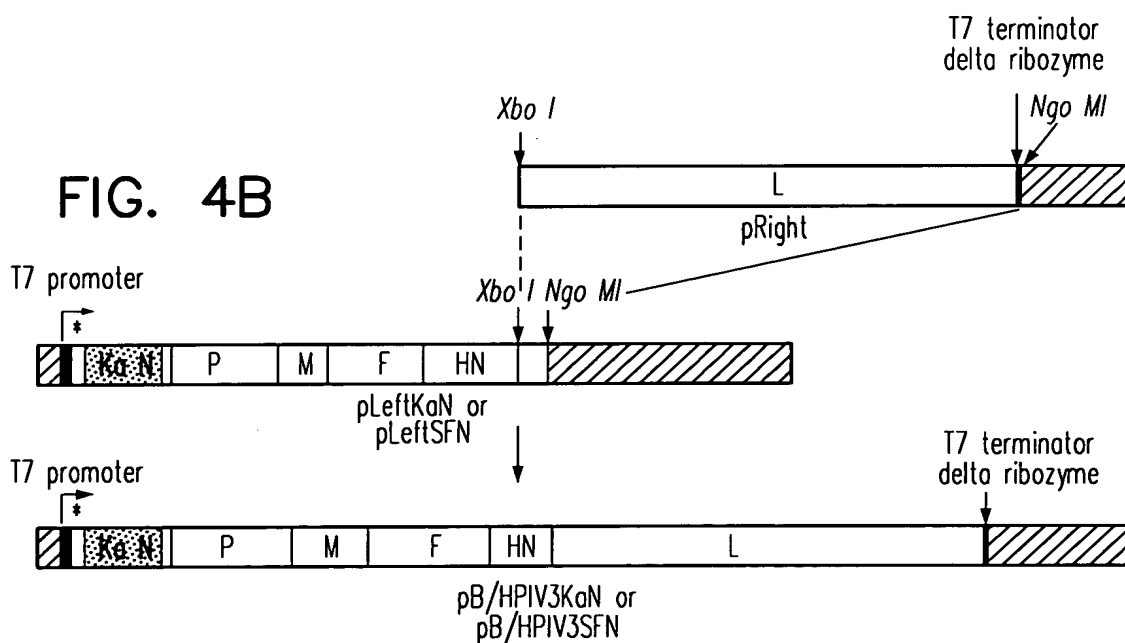






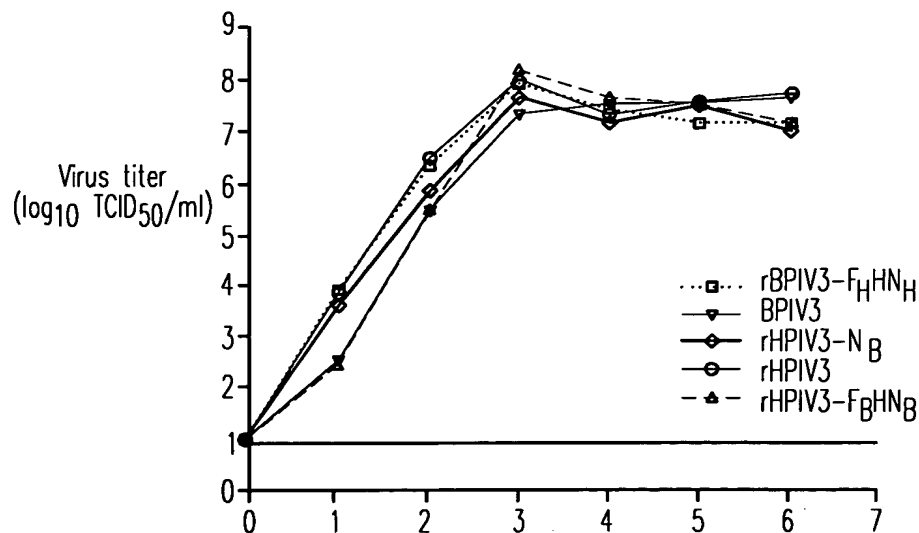
FIG. 5A

SEQ ID NO: 43	rJS	GGAAGTCTATAATTTCAAAAATGTTGAGCCTATTTGATAC
SEQ ID NO: 44	cKa	GGAAGTCTATAATTTCAAAAATGTTGAGTCTATTCGACAC
SEQ ID NO: 45	cSF	GGAAGTCTATAATTTCAAAAATGTTGAGTCTATTCGACAC
SEQ ID NO: 46	Ka	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC
SEQ ID NO: 47	SF	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC

FIG. 5B

SEQ ID NO: 48	rJS	TTAAGCATTTTGAAGCAACTAATCGAATCAACATTTTAA
SEQ ID NO: 49	cKa	TCAGTGCATTTCGGAAGCAACTAGTCGAATCAACATTTTAA
SEQ ID NO: 50	cSF	TCAGTGCATTTCGGAAGCAACTAGTCGAATCAACATTTTAA
SEQ ID NO: 51	Ka	TCAGTGCATTTCGGAAGCAACTAGTCACAAAGAGATGACCA
SEQ ID NO: 52	SF	TCAGTGCATTTCGGAAGCAACTAGTCACAAAGAGATGACCA

FIG. 13



### Confirmation of identity of potential BPIV3/HPIV3 chimeras by TaqI digestion

Figure 6A

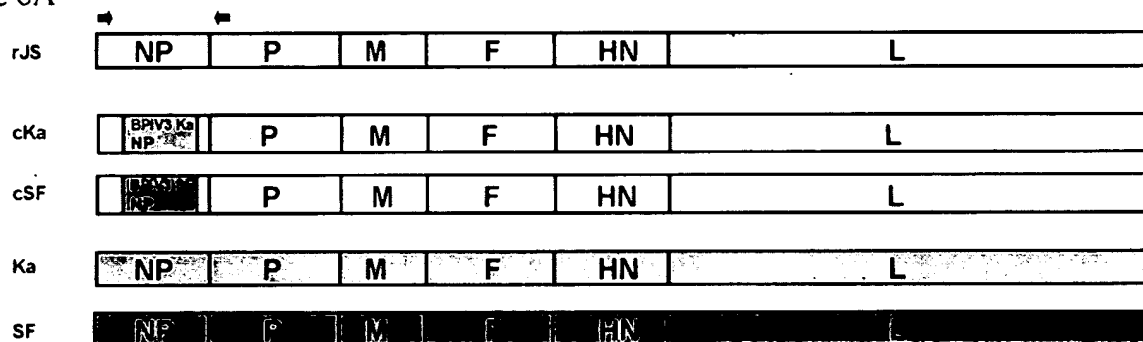


Figure 6B

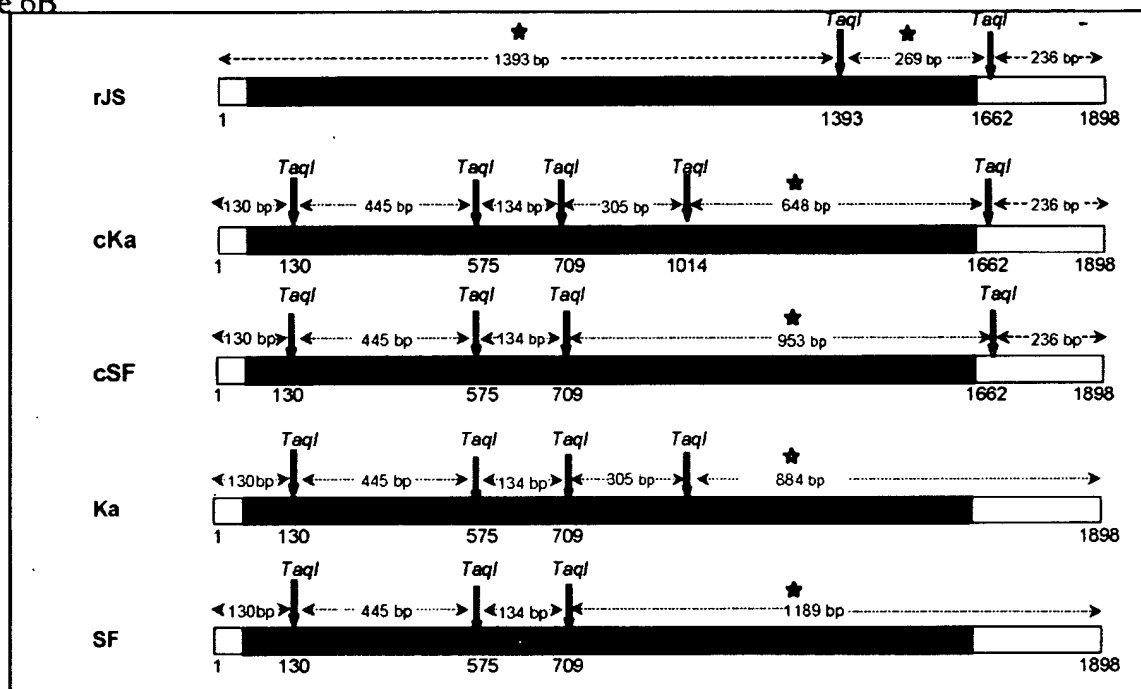


Figure 6C

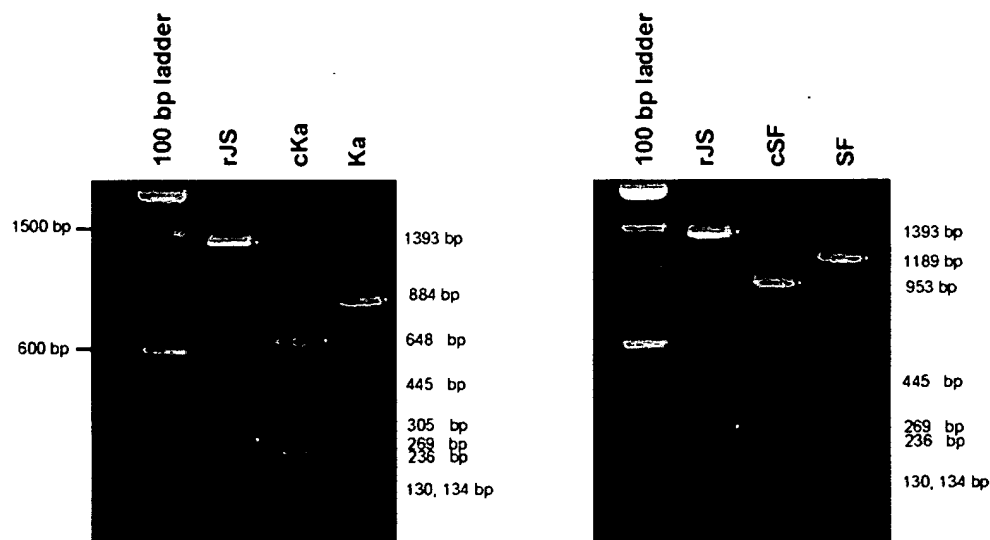




FIG. 7A

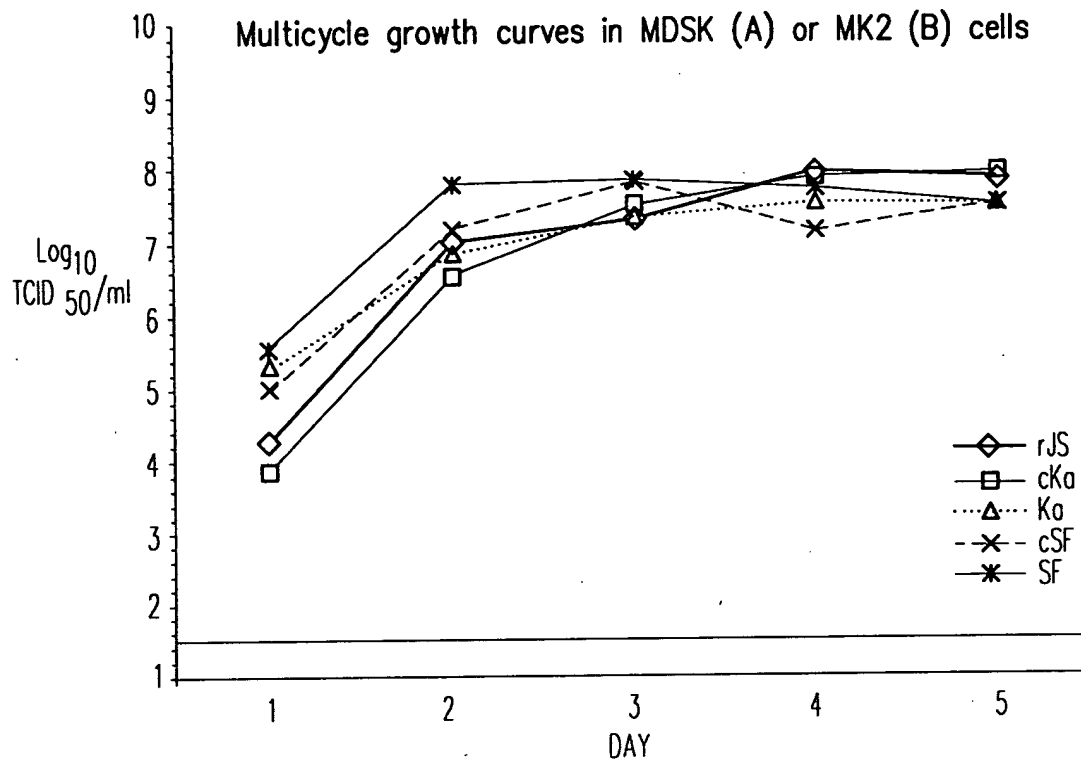


FIG. 7B

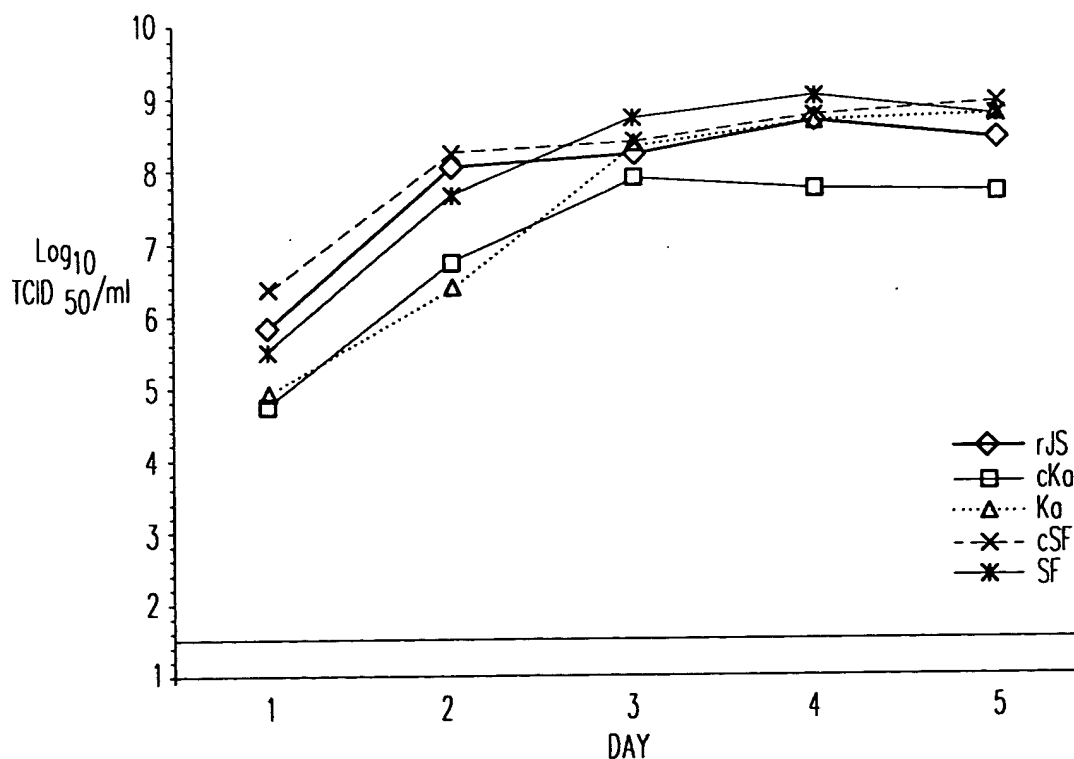




FIG. 8A

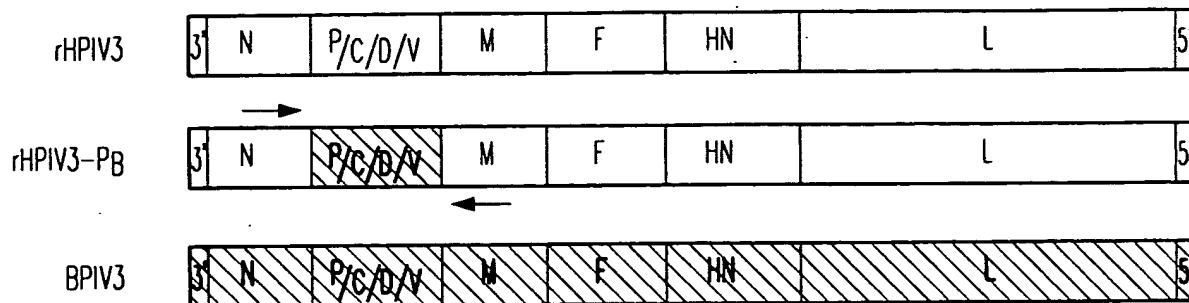


FIG. 8B

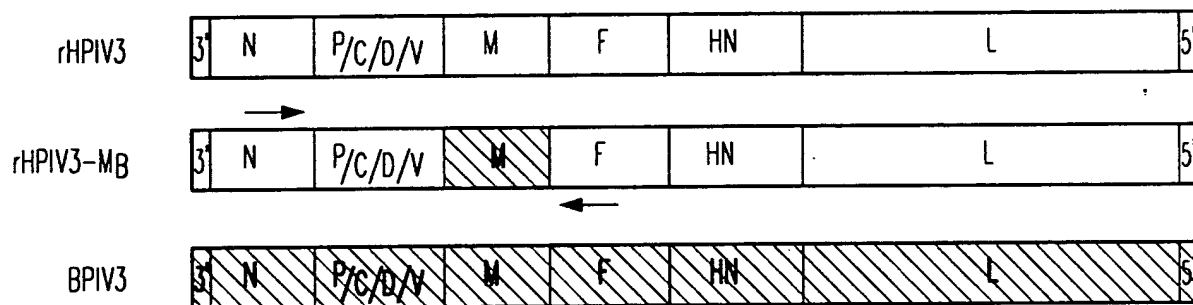
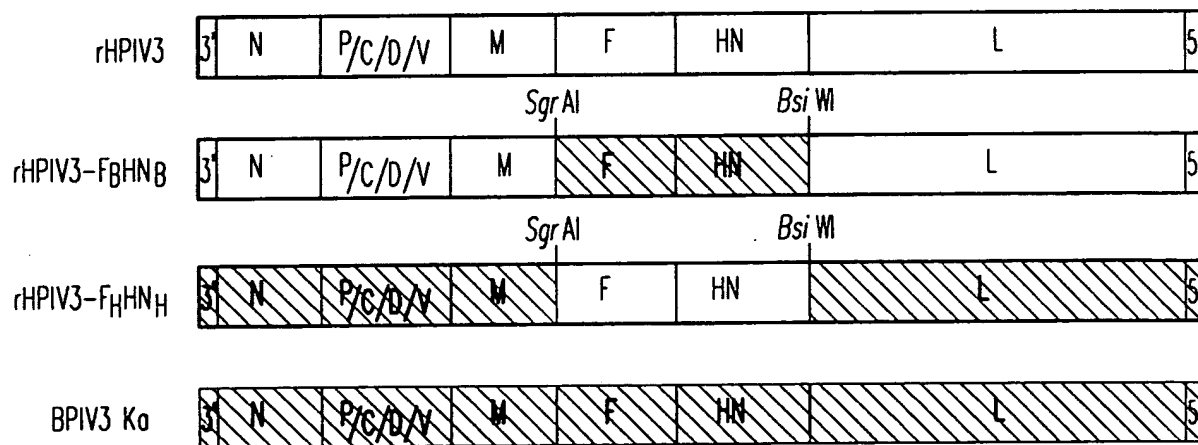


FIG. 11A



jc965 U.S. PRO  
10/15/02

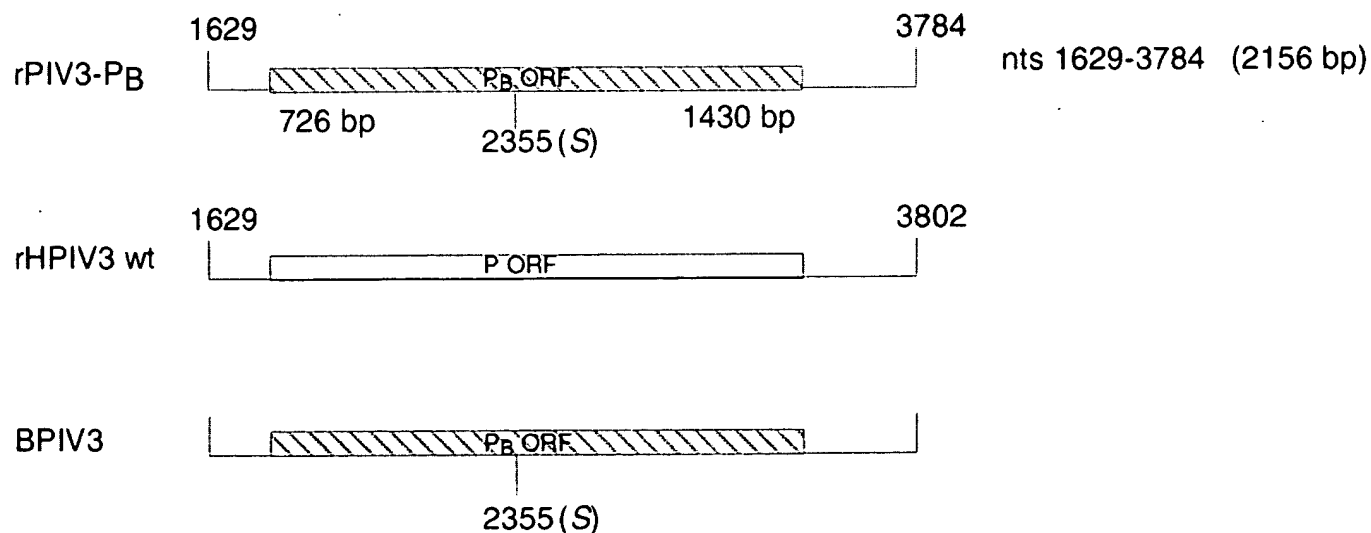
Figure 9A



### Figure 9B



### Figure 9C



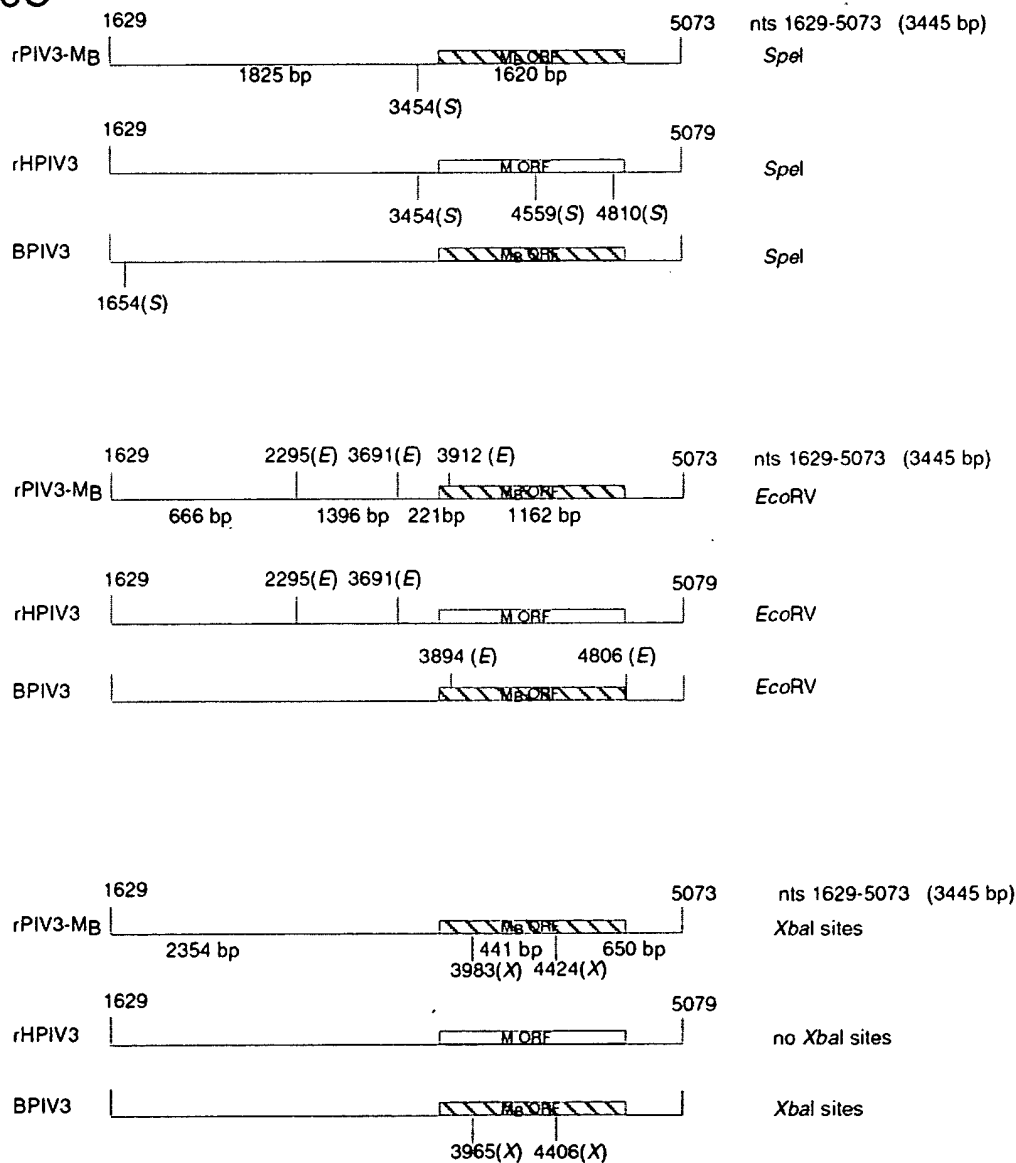
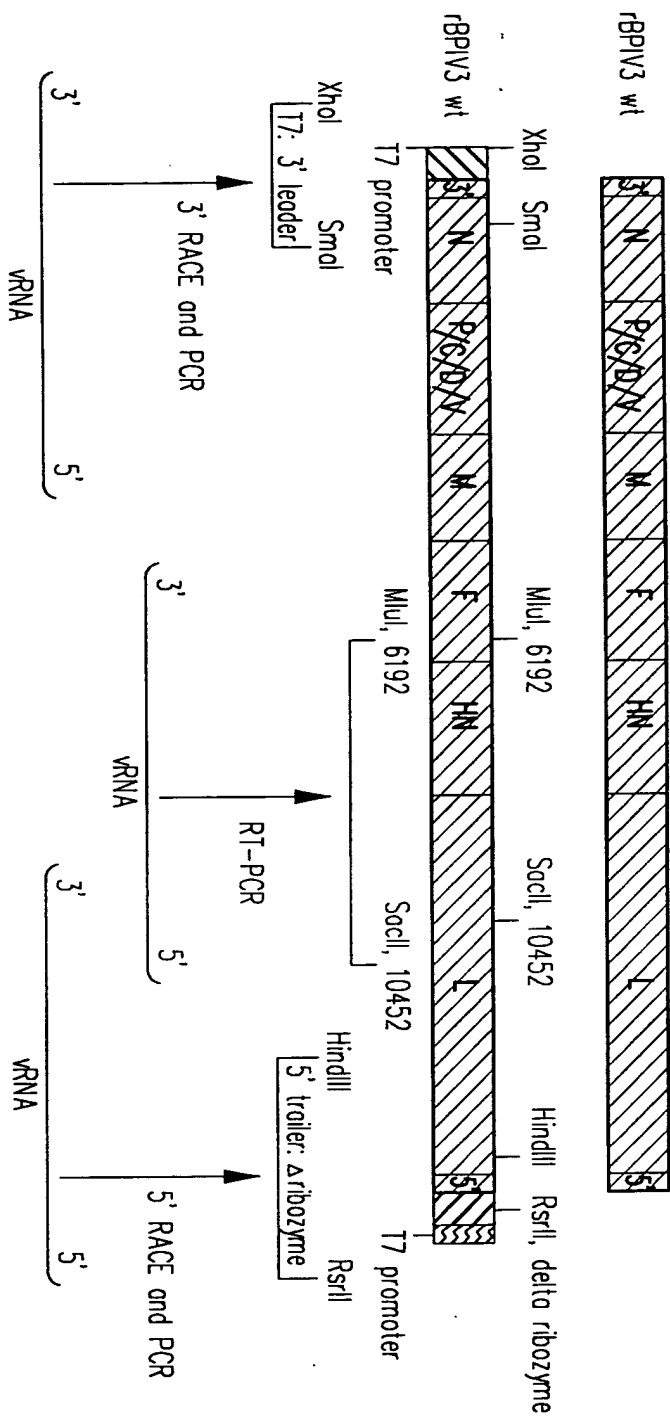


FIG. 11B

Assembly of an antigenomic cDNA for BPIV3 Ka

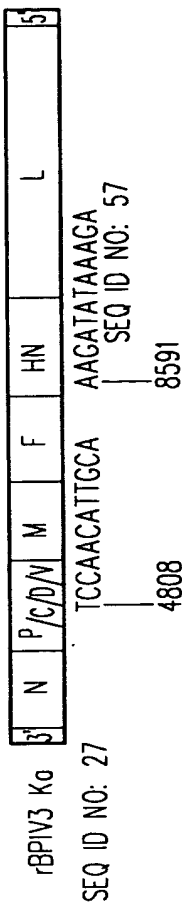
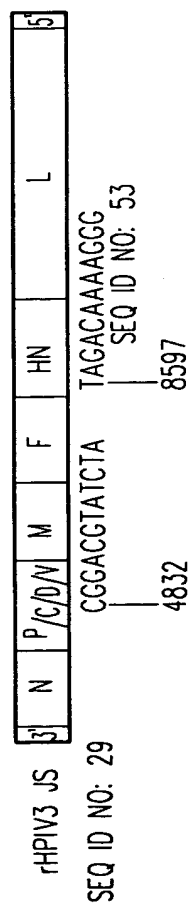




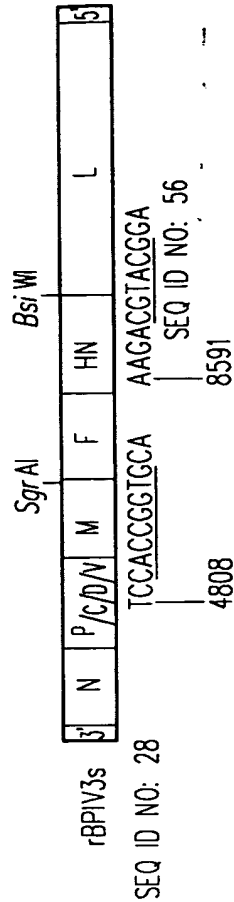
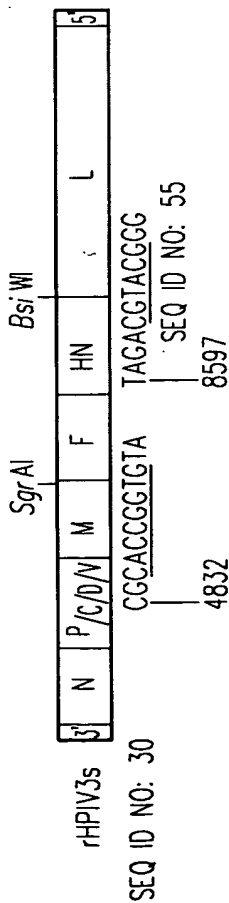
## FIG. 11C

Generation of full length cDNA clones encoding HPIV3/BPIV3 antigenic chimeric viruses

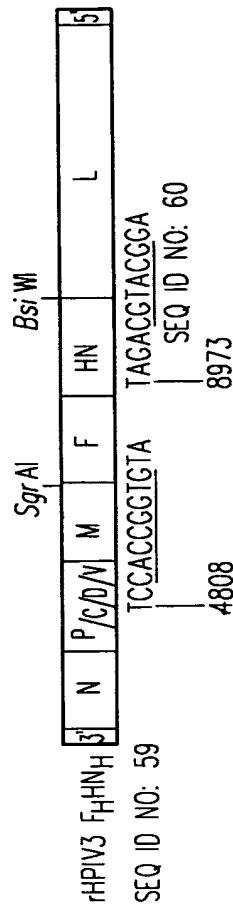
### Generation of HPIV3 and BPIV3 full length clones



### Mutagenesis to create unique SgrAI and BsiWI restriction sites



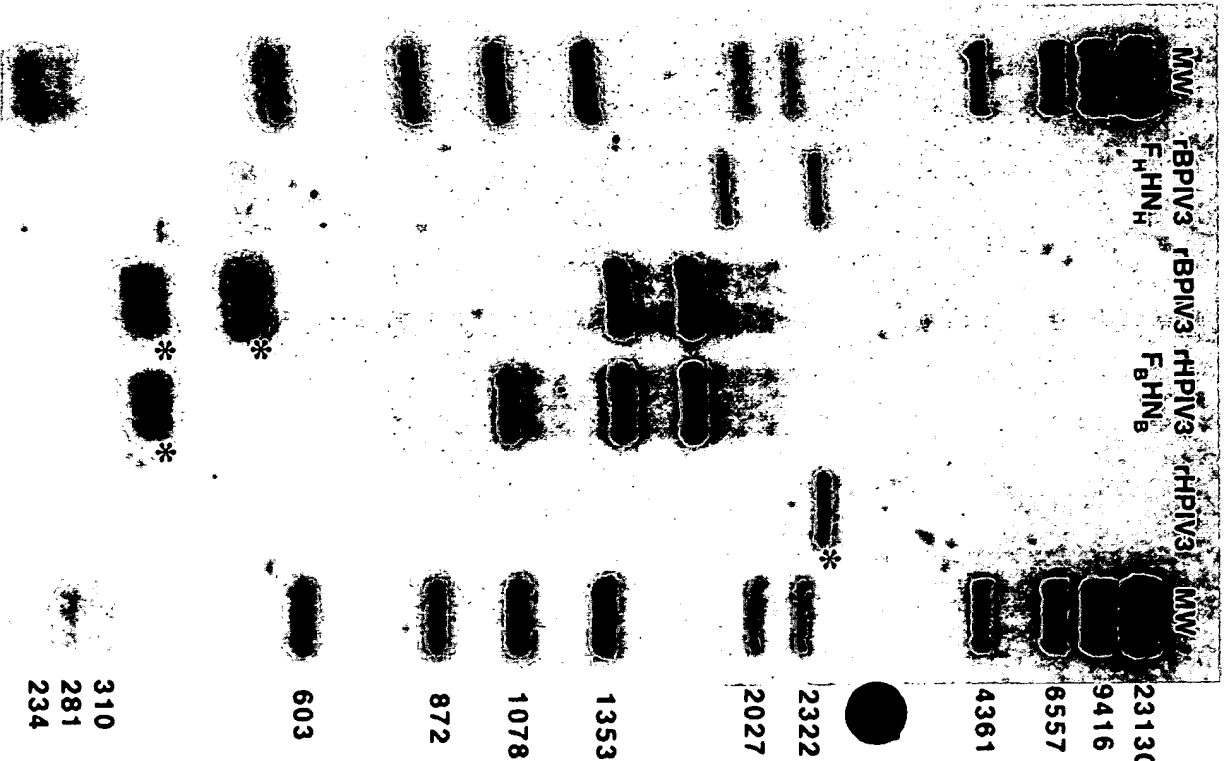
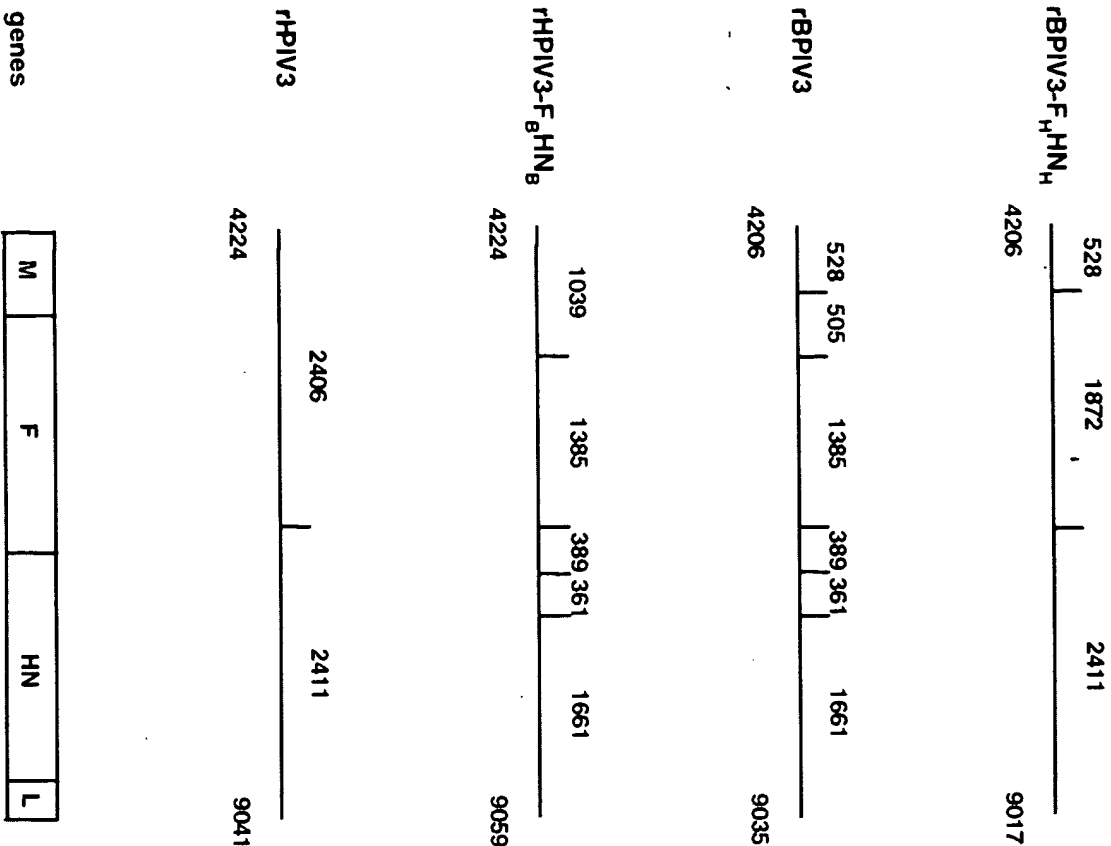
### 3. Cloning of the F and HN genes into the heterologous full length cDNA





SCANNED

Figure 12



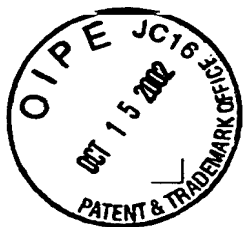


FIG. 14A

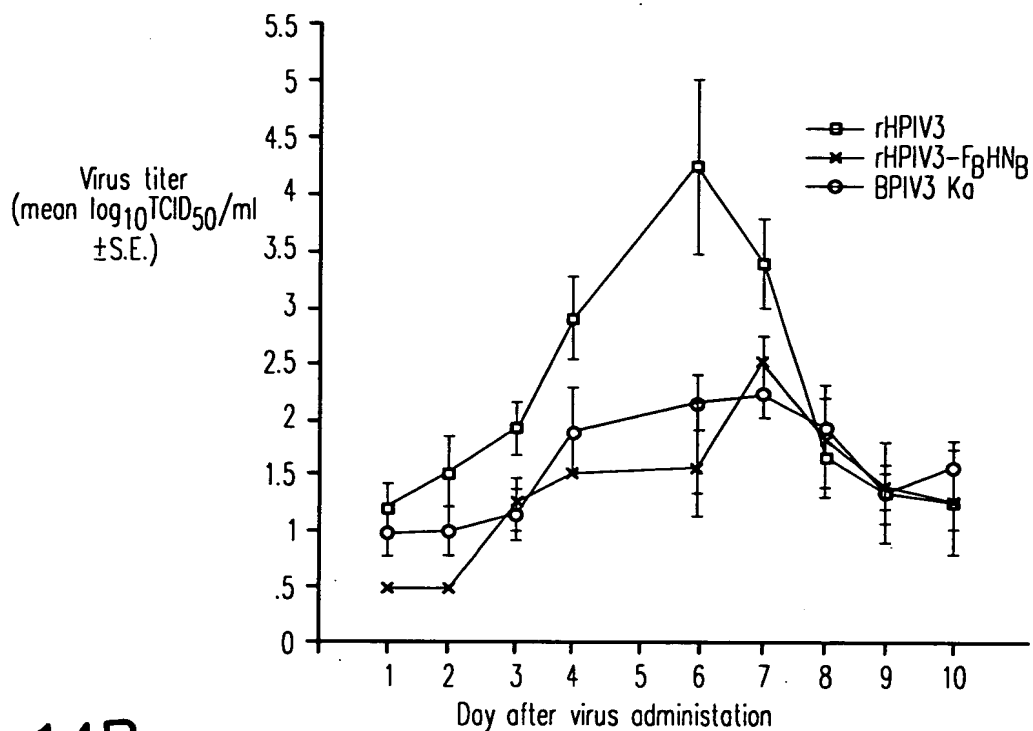
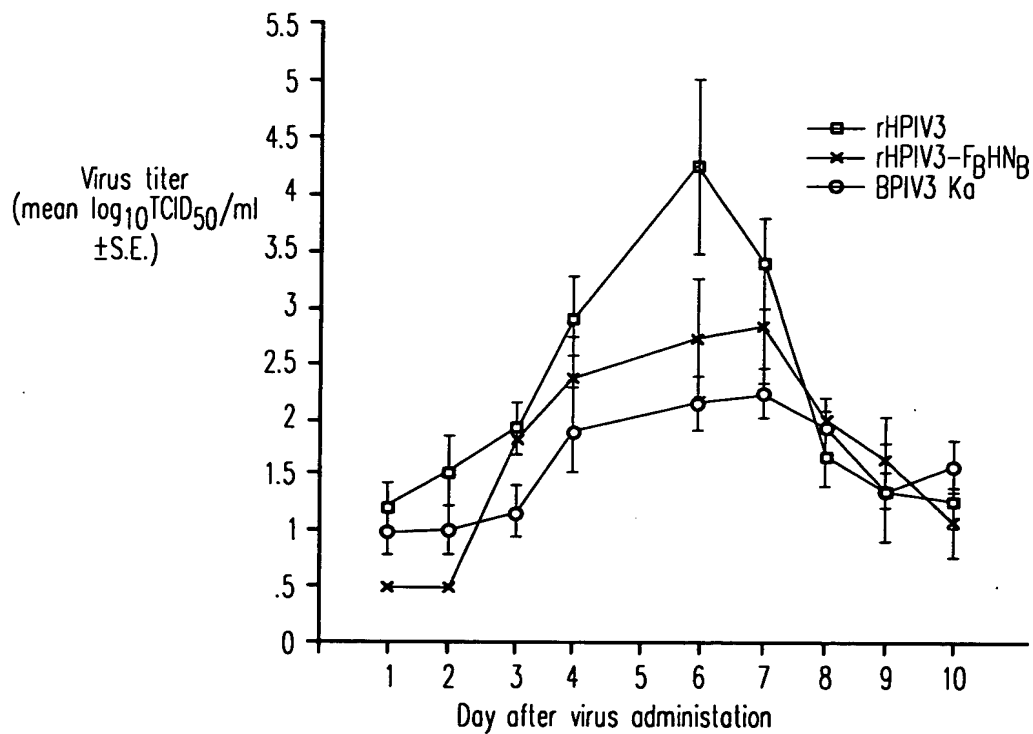


FIG. 14B



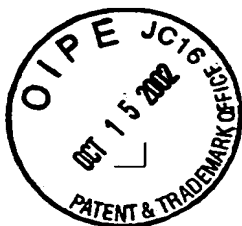


FIG. 15

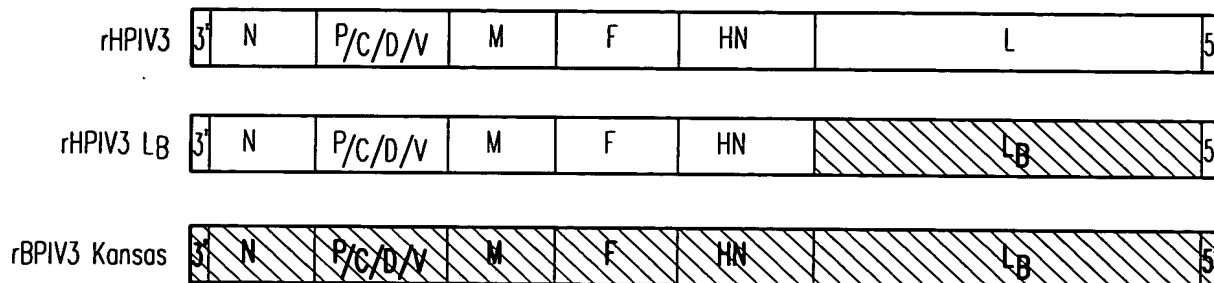


FIG. 16

L START

SEQ ID NO: 61 rHPIV3 WT 8623 5' TAGGAGCAAAGCGTGCTCGGAAATGGACACTGAATCTAACA 3' 8664  
SEQ ID NO: 62 rHPIV3 Lb 8623 5' TAGGAGCAAAGCGTGCTCGGAAATGGACACCGAGTCCCACA 3' 8664  
SEQ ID NO: 63 rBPIV3 wt 8617 5' TAGGAGAAAAGTGTGCAAGAAAAATGGACACCGAGTCCCACA 3' 8658

L STOP

SEQ ID NO: 64 rHPIV3 WT 15325 5' ATGATGAATTTGATATCGATTAAACATAAATACAATGAAGA 3' 15366  
SEQ ID NO: 65 rHPIV3 Lb 15325 5' ATAATGAATTTGATATTGATTAATACGTACG TACAATGAAGA 3' 15366  
SEQ ID NO: 66 rBPIV3 wt 15319 5' ATAATGAATTTGATATTGATTAATACATAAAAAACATAAAATA 3' 15360